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## Herpetological Miscellany No. I

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ABSTRACT: The paper treats of herpetological novelties from Mexico, Central and South America; the following new species are included: *Bufo gemmifer*, La Venta, Guerrero, Mexico; *Bufo mazatlanensis*, Mazatlán, Sinoloa, Mexico; *Tomodactylus angustidigitorum*, Quiroga, Michoacán, Mexico; *Tomodactylus macrotympanum*, Jacala, Hidalgo, Mexico; *Microbatrachylus* gen. nov. (type species *Eleutherodactylus hobartsmithi* (Taylor)); *Microbatrachylus albolabris*, Córdoba, Veracruz, Mexico; *Microbatrachylus oaxacae*, Cerro San Felipe, near Oaxaca, Oaxaca; *Microbatrachylus minimus*, Agua del Obispo, Guerrero, Mexico; *Hyla forbesi* Acultzingo, Veracruz, Mexico; *Hypopachus ovis*, Tepic, Nayarit, Mexico; *Hypopachus maculatus*, San Ricardo, Chiapas; *Hypopachus caprimimus*, Agua del Obispo, Guerrero, Mexico; *Hypopachus alboventer*, 8 miles east of Cuernavaca, Morelos, Mexico; *Hypopachus cuneus nigroreticulatus*, Encarnación, Campeche, Mexico; *Leptotyphlops magnamaculata*, Utila Island, Honduras; *Leptotyphlops rufidorsum*, Lima, Peru; *Leptotyphlops nasalis*, Managua, Nicaragua; *Leptotyphlops ater*, Managua, Nicaragua; *Phyllodactylus muralis*, Totolapam, Oaxaca, Mexico; *Phyllodactylus magnatuberculatus*, Acapulco, Guerrero, Mexico. Several other rare forms are discussed. Most of the new forms are illustrated.

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THE following paper is based upon material that has been accumulating in the EHT-HMS collection for several years, but descriptions were held back in some cases in order to obtain more adequate series of specimens. It was originally intended to treat of certain of the genera monographically and in separate papers; but to do this would have delayed publication of the new forms for some time. Four of the species are described from specimens in the U. S. National Museum collection.

The excellent drawings are by Walter Yost, of the University of Kansas; the photographs by Dr. Oren Bingham, University of Kansas photographer.

*Bufo gemmifer* sp. nov.

(Plate LIII; figs. 3, 3a, 3b)

*Type.* EHT-HMS No. 18509; El Limoncito, near La Venta, Guerrero; June 29, 1938; E. H. Taylor collector.

*Paratypes.* EHT-HMS Nos. 18497-18508; topotypes, same date and collector.

*Diagnosis.* A large toad with strongly developed preorbital, supraorbital, postorbital and supratympanic crests; a canthal crest more or less developed; supraorbital crests forming continuous curves which diverge strongly; interorbital width much greater than width of an eyelid; only a faint suggestion of parietal crests; parotoid gland much smaller than eyelid; heel reaches to parotoid or slightly behind; snout sharply truncate; subarticular tubercles of hand usually bifid; these and supernumerary tubercles highly elevated, sharply conical; vocal sac usually with a single opening which may be sinistral or dextral (rarely double).

*Description of the type.* Adult male. Head broader than long, with a high, narrow, curving supraorbital crest which is continuous with the supratympanic crests, and together form a sigmoid curve; supratympanic crest forms a shelf which extends out above the tympanum, partially concealing the tympanum when seen from above; only a vague trace of parietal crests; very distinct post- and preorbital crests; canthal crests less clearly defined, extending to above nostrils; snout truncate, sloping sharply to the rather pointed tip of upper jaw; loreal region rather concave, the lores sloping rather sharply; tympanum subcircular, its greatest diameter (6.1 mm.) greater than half the diameter of the eye (9.7 mm.); tympanum separated from the postorbital crest by an appreciable distance; an indistinct, irregular crest, beginning below middle of eye, continues to below tympanum; width of an eyelid (7 mm.) less than narrowest width between the crests (9 mm.); supraorbital crests diverge strongly; width between the supratympanic crests (27 mm.) somewhat less than greatest width of the head (32.5 mm.); parotoid gland small, oval to subtriangular, lying somewhat diagonally behind the end of the supratympanic crest.

Tongue elongate, rounded and widened posteriorly, narrowed in front, free for little more than one-third of its length; choanae small, narrow, transverse, with a prominent transverse ridge behind each; opening of vocal sac dextral.

First finger larger and longer than second; two large palmar tubercles; distal subarticular tubercles of outer three fingers double or

bifid; strong conical tubercles on palm and sides of digits; inner surfaces of first finger with nuptial asperities which are present also on second and third. Foot more than a third webbed, the edges of the digits with a distinct serrate fringe; subarticular tubercles not strongly differentiated from other tubercles on digits and soles; inner metatarsal tubercle oval moderately salient larger than outer; a rather conspicuous irregular row of tubercles in place of a tarsal fold.

Skin strongly tubercular, with two rather prominent rows on back joining anteriorly just back of the parietal region; tubercles on sides a little larger than most of the tubercles on the back; tubercles conical, studded with one large and several small, horny spines (in females the tubercles usually have a single, rounded, horny tip); tubercles low, indistinct on dorsal surface of hand and foot; two or three enlarged tubercles behind angle of the mouth; two pairs of tubercles above the anus.

*Color.* A very indistinct median stripe and a very indistinct, diagonal, lateral stripe; head nearly uniform olive-gray, the crests dark black-brown; arms and legs irregularly barred or marbled with dark olive or blackish; posterior sides of femur reticulated with darker color; below dirty white (the pigment scattered between the tubercles); tympanum blue-black; under surface of hands and feet darker than venter; an inverted V-shaped black mark terminates the dim median light stripe anteriorly; lip cream, with horny tubercles and a rim of dark horn at edge.

*Measurements.* (Type and largest female; measurements in mm.); snout to vent, 90, 99.5; length of snout, 10, 9; length of eye, 9.7, 10.8; diameter of tympanum, 6.1, 6.7; length of parotoid, 8.3, 11; distance between supratympanic crests, 27, 30; arm, 52, 56.5; leg, 99, 107; tibia, 31.5, 36; foot, 45, 48.

*Variation.* The opening of the vocal sac varies. In five specimens the opening is sinistral, in four dextral, and in two, there was an opening on each side; in most of the specimens the tympanum was well separated from the crests; certain specimens have the limbs more conspicuously barred, and the median and lateral stripes contrast more with the general coloration; in others these stripes are almost entirely obsolete. Usually the subarticular tubercles of hand and the distal tubercle of the fourth toe is completely divided or bifid; more frequently only a pair of tubercles is present above the anus.

*Remarks.* The discovery of this species was a great surprise since I had collected in this general region on several previous occasions. On the night following the hurricane which occurred on

June 26, 1938, numerous amphibians were heard calling in the vicinity of my camp. The first night the following were heard calling and specimens of all were taken: *Bufo marmoreus*, *Bufo marinus*, *Microhyla usta*, *Hypopachus caprimimus*, *Hyla baudinii*, *H. staufferi*, *H. venulosa*. The second night following, the same species were heard or taken. The third night the numerous *Hyla staufferi* were replaced by *Hyla underwoodi*, and the *Bufo marmoreus* disappeared from the scene and were replaced by the species here described. On succeeding nights the species was not heard or found again, despite what appeared to be favorable conditions for their appearance.

This form is most closely related to *Bufo mazatlanensis* occurring in Sinaloa and Nayarit. These differ in having the crests somewhat less elevated; a shorter supratympanic crest; a more salient inner metatarsal tubercle, and only the third digit of hand with a divided subarticular tubercle. The smaller tubercles of sole and palm are much reduced. The parotoid gland is larger and placed farther forward. (Compare with *valliceps*; pl. LIII, fig. 2.)

The species name is in reference to the old belief that the toad carries a jewel in its head.

*Bufo mazatlanensis* sp. nov.

(Plate LIII, fig. 1; Plate LIV)

*Bufo valliceps* Taylor, Univ. Kansas Sci. Bull., XXIV, 1936 (1937), pp. 509-510.

*Type*. EHT-HMS No. 374; two miles east of Mazatlán Sinaloa, Mexico; July 20, 1934, E. H. Taylor coll.

*Paratypes*. EHT-HMS Nos. 373-379; same data.

*Diagnosis*. A large toad with a known maximum size (♀) 86 mm.; related to *gemmifer*, but with a pronounced dorsal stripe, narrower head, the parietal crests more distinct, shorter snout, a larger, more transversely placed parotoid; supratympanic crest shorter, not forming shelf above tympanum; all crests topped with black horny epidermis.

*Description of the type*. Head somewhat wider than long; crests high and narrow; well-developed supraorbital crest which curves behind eye to the supratympanic crest; postorbital and preorbital crests well developed, the latter narrowly separated from the low horncovered crest on the upper jaw; thickened canthal crests, more or less horn covered, extend to a point between nostrils; supratympanic crest does not or only slightly projects over the tympanum and does not conceal tympanum when observed from above; parietal crests moderately developed.

Snout very truncate the nostrils extending as far forward as the upper lip; loreal region somewhat concave; tympanum subcircular the crests forming the upper anterior border, its greatest diameter (6.1 mm.) much less than length of eye (8.5 mm.); latter slightly less than distance from eye to tip of snout (8.9 mm.); width of an eyelid (6 mm.) less than interorbital distance (measured from tops of crests, 9.3 mm.); width between the supratympanic crests (23 mm.) less than width of head (29 mm.); length of parotoid (10 mm.), lying diagonally, separated from eye by a distance of 6 mm., abutting against the termination of the supraorbital crest. Tongue elongate, rounded, widened posteriorly, narrowed in front, free for a third of its length; choanae moderate, a high ridge behind each; each with a curved anterior ridge, the innermost edge of which forms a toothlike free process (also in *gemmifer*); (character of vocal sacs in male unknown). Limbs more slender than in *gemmifer*; first toe longer than second; two large palmar tubercles; distal subarticular tubercle on third finger bifid; tuberculation on fingers and palm rounded, but not spinose or conical.

Tibiotarsal articulation reaches the tympanum; subarticular tubercles of toes single; supernumerary tubercles somewhat more conical on hand, but much less prominent and fewer than in *gemmifer*; foot nearly half webbed, slightly more extensive than in *gemmifer*. Inner metatarsal tubercle high, with slightly compressed inner edge, its greatest length about that of first toe; outer tubercle elongate; tarsal fold represented by a few, larger, spinose tubercles. Skin strongly tubercular, the tubercles tipped with brown horn (a single point in females or the entire tubercle covered except laterally and posteriorly, where there may be several horny points). Snout and lores with spots of brown horn; tubercles on sides largest; venter with equal, small, tubercles.

*Color.* An irregular median light cream line terminating at occiput; diagonal lighter lines on sides scarcely discernible due to marbling with brownish; on each side of median lines, indefinite darker and lighter brown areas; legs indefinitely barred and marbled with brown; venter immaculate yellow-cream; crests deep black or black brown.

*Variation.* Four paratypes are females and save for size are uniform for most characters; the color is similar save that No. 373 is much lighter than the type (three paratypes are skeletons).

*Measurements in mm.* Snout to vent, 85; length of snout, 7.2; width of head, 29; length of head, 24; arm, 48; leg, 95; tibia, 28.5;

foot, 44 (measurements of paratypes are given in Taylor [1937, *op. cit.*]).

*Remarks.* The type series was dug out of a pile of rock and earth only a few meters above sea level; their call was not heard.

In Taylor (1937, *op. cit.*) I state that the specimens were compared with *valliceps* from Guerrero. The locality should have been Veracruz. I have examined the type of *argillaceus*, and the present species is quite unrelated. In Kellogg (Bull. 160, U. S. N. M., 1932, p. 71) two specimens of *valliceps* are reported from Acaponeta, Nayarit. I rather suspect that the specimen is not *valliceps*, since it is several hundred miles out of the known range.

No further comparison with other Mexican toads is needed. (Compare figure 1, Plate LIII, with *valliceps*, Plate LIII, fig. 2, and *gemmifer*, Plate LIII, fig. 3.)

*Tomodactylus angustidigitorum* sp. nov.

(Plate LV; figs. 1, 1a, 1b)

*Type.* EHT-HMS No. 18640; collected at Quiroga (northeastern end of Lake Pátzeuaro), Michoacán, México, elevation 6,880 ft., September 5, 1938, by Edward H. Taylor.

*Paratypes.* EHT-HMS No. 3713, collected near San Martín, west México, August 3, 1932; Nos. 18641-18648, 18650, nine miles west of Zacapú, Michoacán, near Cerro de Tecolote, September 6 and 7, 1938; Nos. 21579-21588 collected four miles east of Carapa, Michoacán; all collected by E. H. Taylor.

*Diagnosis.* A small member of the genus, known maximum length 25 mm.; digits tapering, the terminations narrower than digits; lumbar gland very distinct, short, somewhat removed from groin; a discontinuous fold from eye to lumbar gland more or less distinct; parotoid gland distinct; abdomen strongly granular; tongue large, slightly nicked behind, free for nearly half its length; tympanum small, indistinct, separated from eye by a distance greater than its diameter; limbs relatively short, the heel not or scarcely reaching tympanum.

*Description of the type.* Head slightly narrower than body, the frontal region narrowed; canthus rostralis distinct, very slightly rounded; upper part of lores nearly vertical, then sloping to lip, leaving a broad, shallow depression between eye and nostril; inter-orbital width (2.35 mm.) only a little wider than eyelid (2.1 mm.); length of eye (3.5 mm.) about equal to length of snout (3.55 mm.), but somewhat shorter than distance from eye to the tip (3.8 mm.);

distance between nostrils equals distance of eye from nostril; tympanum small, indistinct, its diameter about .75 mm., separated from eye by a greater distance (1.1 mm.); snout pointed; nostrils not terminal, the distance from tip of snout being 1.2 mm. Tongue rather narrow, elongate, free for nearly half its length, slightly nicked behind; choanae lateral, vertically placed, seen from below they are concealed by projections from upper jaws; mucuous glands have small openings between choanae; openings of the vocal sacs large.

Arm brought forward the wrist reaches the tip of the snout; tips of outer fingers no wider than inner fingers; subarticular tubercles very large, rounding, not conelike; first finger shorter than second; a large median palmar tubercle; the outer palmar tubercle variable; that at base of first finger distinct; four or five other enlarged palmar tubercles and numerous smaller ones; small tubercles between the bases of adjoining digits and bordering basal edges, give a serrate appearance; an indistinct tubercle on wrist and elbow; leg brought forward the tibiotarsal articulation reaches to arm insertion or very slightly beyond; fourth toe long, the fifth very short and slender, the metatarsals of these toes united; subarticular and supernumerary tubercles conical, salient; sole with several large, and numerous smaller tubercles; a large inner metatarsal tubercle, and an equally large outer; no trace of a tarsal fold; when limbs are folded the heels touch.

Skin above relatively smooth; a few flattened, rather indistinct pustules on back; a dorsolateral lumbar gland separated from groin by an appreciable distance; running forward from the gland a more or less continuous fold reaches to near eye, not continuous with the very indistinct supratympanic fold; a parotoid gland lying somewhat diagonally behind tympanic region and extending to above arm insertion; abdomen and sides covered with relatively large granules; granules cover most of under side of femur and much of its posterior face; chin and breast smooth.

*Color in life.* Reddish-brown on dorsal surfaces with some indistinct darker flecks and spots; lumbar gland deep black and silvery white; chin pigmented with light blackish-brown; venter lightly pigmented with brownish-black, the summits of the granules silver; under surfaces of tibia more or less barred with brown and cream; dorsal and posterior part of femur more or less uniform brown; ventral surface of femur flesh; sides of head and lores blackish; snout somewhat more grayish than black.

*Measurements in mm.* Snout to vent, 24.2; length of snout, 3.55; snout to arm, 8.5; length of head, 9.3; width of head, 8; arm, 15; leg, 29; tibia, 9.2; foot, 15.2.

*Variation.* Most of the proportional measurements and the general structural characters of the paratypes agree with the type. In color they vary to a considerable extent, some being nearly uniform gray-black above; others are deep brown, while still others are brownish-gray with black spots; one specimen shows rather distinct bars on the femur. Females are usually flesh below—and less pigmented than the type. A few have a rather indistinct light bar between the eyes as occurs in other species. The fold from eye to the lumbar gland may be broken into a row of short folds or pustules. In some the tympanum is entirely concealed, but usually its outline can be discerned. In most the border of the ventral disk is very indistinct.

Specimens were encountered hopping about on the ground or ensconced under stones. The voice has not been heard. No specimens were found in trees. The narrowed tips of the digits, the shortened limbs and the poorly developed disk may be stigmata of a terrestrial habitat, despite the fact that none have been encountered save in forested areas. *Tomodactylus nitidus*, another terrestrial species, has been taken largely in open fields far from forest.

Of the known species, the relationship is probably closest to *Tomodactylus amulae* Günther. This species lacks narrowed tips on the toes.

*Tomodactylus macrotympanum* sp. nov.

(Plate LV; figs. 2, 2a, 2b)

*Type.* EHT-HMS collection No. 6838; collected south of Jacala, Hidalgo, Mexico, July 2, 1936, by Edward H. Taylor.

*Paratypes.* EHT-HMS Nos. 6815-6837, 6839-6840, collected 8-18 miles south of Jacala (by highway) chiefly at a point on highway marked La Placita, and a tiny village Minas Viejas. Same date and collector.

*Diagnosis.* A large member of the genus (known maximum size 31 mm.), with the lumbar gland moderately distinct, extending to groin, not colored black and white; tympanum large, very distinct, more than three-fourths diameter of eye; abdominal disk more or less distinct; abdomen not granulate save on sides, and very indistinctly granulate posteriorly; enlarged terminal disk on two outer fingers nearly double the smallest width of these digits.

*Description of the type.* Head about as broad as body; the in-



terorbital distance (3.7 mm.) much greater than the width of an eyelid (2.4 mm.); length of the eye (3.4 mm.) less than length of snout (4.6 mm.) but equal to the distance to nostril; diameter of tympanum (2.6 mm. wide, 2.9 mm. high), equal to or slightly more than three-fourths length of eye; the rim of the tympanum thickened, overhanging the angle of the mouth; canthus rounded, the lores sloping; region about nostrils only slightly raised, lacking groove or depression between them.

Tongue small, pyriform or bottle-shaped, apparently not nicked behind; choanae lateral, when seen from below almost wholly concealed under the projection from the jaw; vocal sacs present, the openings elongate; the sacs indicated on the sides of chin by longitudinal folds.

Arm brought forward, nearly half of forearm extends beyond snout; terminations of two outer digits thickened, truncate, nearly twice as wide as the narrowest part of digit. Subarticular tubercles very large, rather rounded, with dim supernumerary tubercles; three posterior palmar tubercles, the median largest more or less contiguous with the outer (smallest); two other large, and several smaller tubercles on palm; other small tubercles between and bordering inner basal edges of digits; one or two tubercles on under side of forearm near wrist; other tubercles present on elbow; leg extended, the tibiotarsal articulation reaches eye; digits thickened, but not or slightly widened at tips; no webs, but a thickened tubercle between the bases of adjacent digits may represent a remnant; subarticular tubercles and to a lesser extent the supernumerary tubercles strongly salient, conical in shape and pointing slightly forward; sole of foot with about ten enlarged tubercles with numerous smaller granular tubercles; a large inner metatarsal tubercle; outer somewhat smaller; no trace of a tarsal fold; small tubercles on heel; free part of the third finger much longer and extending slightly farther forward than fifth.

Skin above rather roughened, with scattered pustules; upper surface of limbs smooth, with a few indistinct pustules on exposed surface of leg; sides of neck and body and the posterior part of abdomen covered with more or less distinct, flattened granules; more than half the under surface of femur granular, and part of the posterior surface; the granules of the back part of the underside of femur are more or less fused, forming transverse rows. A large lumbar gland extending nearly half the distance between axilla and

groin, somewhat granular above, with pits (visible under the lens); the edges of the glands are not strongly defined save by the presence of the pits; an ill-defined parotoid gland lies behind the tympanum above the arm and is likewise pitted. Two or three tubercles behind lower part of tympanum; the ventral disk is more or less distinctly outlined.

*Color.* Above gray, with a darker, somewhat symmetrical area extending from between eyes to rump; a gray bar connects the eyes preceded by a darker spot; other dark flecks on sides and dorsolateral region; exposed surfaces of arms and legs with darker flecks or bars. Femur and foot grayish, with alternating cream and gray areas scarcely differentiated. Below cream-flesh with a thin peppering of pigment. Front face of femur and groin with less pigment. A few light spots on upper and lower lips.

*Measurements.* Snout to vent, 29.3 mm.; length of snout, 5 mm.; snout to foreleg, 10.5 mm.; width of head, 11.1 mm.; length of head, 11 mm.; arm, 19 mm.; leg, 42.4 mm.; tibia, 13.3 mm.; foot, 21.2 mm.

*Variation.* In most of the structural characters listed the paratype series is practically uniform. In the distribution of pigment on the dorsal surface there is considerable variation. In some specimens the pigment is scattered in small dark flecks on the gray ground color; in others there is greater concentration of the pigment and there are fewer, but larger spots. The light bar across the head is usually evident, and some of the specimens have no darker area preceding the bar. In practically all, the chin, throat, breast and most of the abdomen are smooth. Folds on chin may be wanting.

*Remarks.* Most of the specimens are males. They were for the most part obtained from low trees and shrubs at an elevation between 6,000 and 7,000 feet, on a rainy night. The call sounds much like a short whistled note, pitched about five notes above middle C. Perhaps blinded by the light, they remained quiet at my approach. The call is such as to render its source difficult to locate. However, once found, the specimens were taken without difficulty.

The relationship is probably with *Tomodactylus nitidus* from which it differs in the much larger, more distinct tympanum; skin less pustulous above; longer legs, and the heels overlapping when folded at right angles. The lumbar gland less distinct and not strongly marked in black and white. Terminations of outer fingers more widened.

This adds another species to the distinctive fauna of the state of Hidalgo.

Among the specimens of Eleutherodactylid frogs collected in Mexico during the last eight years by Doctor Hobart M. Smith and myself are some three hundred small specimens, referable to several species which have, in combination, characters that seem to warrant their separation into a genus of their own. Two of these I have already described in the genus *Eleutherodactylus*, aware that such an association was not wholly justified. I now propose the following genus for their reception:

MICROBATRACHYLUS genus novum

*Genotype: Eleutherodactylus hobartsmithi* Taylor

*Generic description.* Very diminutive frogs; hand and foot lacking trace of web; outer metatarsals united; terminal disks present or absent; no vocal sacs, or chin folds; no vomerine teeth; tongue thick, shaped like a grain of maize, free for a third of its length; a flat inguinal gland; ventral disk on venter broadly triangular, terminating on thighs; gonads with black pigment; an elongate, narrow, cartilagenous omosternum; sternum of cartilage, the posterior extension narrowed medially; the termination indistinctly bifid.

It is especially surprising that these small species have not been encountered by earlier collectors. It is possible that some specimens exist in other collections masquerading under false nomenclature. That these are not the young of various species of *Syrrophus*, *Tomodactylus* and *Eleutherodactylus* is attested by the presence of fully adult males and females of the several species. Moreover, the young of most of the known Mexican species are at hand and these are easily identified, since most of the specific characters (size excepted) are evident in newly transformed young. I am of the opinion, based on the size of the ovarian eggs and the presence of specimens in places where standing water is not readily accessible, that most Mexican species of *Eleutherodactylus*\* have direct transformation without a protracted free-swimming larval stage. Thus specific characters are not obscured by adaptations resulting from the free-swimming larval life.

There is strong sexual dimorphism in *Microbatrachylus* as regards size, and in the diameter of the tympanum. Most of the species are terrestrial in habit, although there is a report of specimens of *hobartsmithi* having been taken in low plants (Taylor, 1937, *op. cit.*).

The following species are recognized: *Microbatrachylus hobartsmithi*, *pygmaeus*, *albolabris*, *oaxacae* and *minimus*. Further study on other forms is necessary and these are not included.

\* *Eleutherodactylus ruquulosus*, is apparently an exception since the newly transformed young are abundant along streams. (Possibly *E. nator* and *vocalis* also are exceptions.)

*Microbatrachylus pygmaeus* (Taylor)

*Eleutherodactylus pygmaeus* Taylor, Trans. Kan. Acad. Sci., 39, 1936 (July 2, 1937), pp. 252-254, pl. 1, figs. 3-4 (type locality, one mile north of Rodriguez Clara, Veracruz).

The type of this species is a female. The two paratypes listed belong to two other species of this genus.

A series of specimens belonging to this species was obtained in Potrero Viejo, and Cuautlapa, Veracruz, since the type description was published. Most of the specimens were obtained, both during the day and the night, by tracing their feeble chirps. This usually entailed some difficulty since they are active and their alert movement makes them difficult to find in grass and leaves. All were on the ground.

The males of the species are diminutive, the largest of sixteen measuring 16 mm., while most of the others are less than 15 mm. in snout to vent measurement. The largest of fourteen females measures 19 mm. in length. It would appear that the sexual dimorphism as regards size is distinctly less than in *hobartsmithi*. The size of the tympanum is distinctly greater proportionally in the males than in the females of that species. The males of *pygmaeus* have large tympani, their diameters equal to about four-fifths or more of the diameter of the eyes. In both sexes the characters of the widened tips of the digits, the absence of a tarsal fold or row of tubercles on the tarsus, the absence of a small outer palmar tubercle, the presence of an axillary gland, the absence of vomerine teeth, the presence of the large inner metatarsal tubercle two to three times the size of the outer, may be regarded as constant. I find no vocal sac in the males. The tibiotarsal articulation usually reaches the eye or at most only slightly beyond.

The dorsal markings vary considerably, but the inverted V-shaped marking on the shoulders is invariably present; two small spots are present, in the dorsal lumbar region, and a dark diagonal mark from eye to the side, passing behind the arm, is usually present. A few specimens have a dark interorbital bar, and a dark stripe on the lores is more or less distinct.

The general color of live or newly preserved specimens is lavender or purple, there being no red or rosy color visible as in *hobartsmithi*.

The data in the type description taken from the paratypes must be disregarded as these specimens do not belong to this species.

The following specimens are referred to this species: Nos. 6419-6422, 6430-6436, 18187, Cuautlapa, Ver.; Nos. 18127, 18128, 18185-18187, 21612-21614, 22061, 22061A, 22063, Potrero Viejo, Ver.; Nos.

6423, 6437, San Juan de Gracia, Ver.; Nos. 6425, 6426, 6438, Córdoba, Ver. All collected by E. H. Taylor.

Dr. Hobart Smith informs me that he obtained nearly two hundred specimens of this species in the general region about Potrero Viejo, Veracruz, during the winter of 1938-1939.

*Microbatrachylus hobartsmithi* (Taylor)

*Eleutherodactylus hobartsmithi* Taylor, Trans. Kan. Acad. Sci., 39, 1936 (July 2, 1937), pp. 355-357, pl. 1, figs. 5-6 (type locality Uruapan, Michoacán).

This species was described from a male type, and only males are present in the paratype series. All were found at night by tracing their calls. I collected a series of forty specimens from among grass and weeds near the edge of a small stream about ten miles west of Villa Victoria, México, September 1, 1938. These were taken in the daytime, and no calls were heard. The lot contains only eight males. The females are proportionally very large, reaching a length of 22.5 mm., and more than three times the bulk of the males. The longest male has a snout to vent length of only 15.1 mm. The larger females contain large, nearly ripe eggs. The size of the eggs suggest that they have a direct mode of development rather than one involving an aquatic larval stage.

The color patterns are for the most part more strongly defined than indicated in the type figures. The ground color is a pinkish-gray with blackish markings, which are more or less symmetrical on the back. The dorsal and ventral surfaces of the femur are light red. The upper arm is of a rosy cream. The chin and venter are dull flesh or occasionally rosy flesh with a scattering of pigment, usually heavier on the chin and breast; in males and a few females the chin is rather blackish. The limbs are more or less barred in all specimens. The tympanum in males is often of almost the same diameter as the eye; in females it is proportionally much smaller, varying from about one-half to two-thirds the eye diameter. In most of the specimens the tongue is a little longer than in the type, with nearly two-fifths of the posterior part free. I am unable to find openings to the vocal sacs, in these males, and a reëxamination of the type shows folds along the sides of the floor of the mouth, but the openings were probably made with a probe. The statement that vocal sacs are present is to be regarded as incorrect.

The granulation of the venter is confined to the posterior parts. Proximal parts of the underside of the femora and a broad triangular patch on their posterior faces, lying below anus, also granular. In

most of the specimens the inner metatarsal tubercle is very large, its length equal to about two-thirds the length of the inner toe above the tubercle, and distinctly larger than the outer metatarsal tubercle. In several specimens the basal subarticular tubercle of the fourth toe is double. The gland in the groin, not mentioned in the type description, is present in all specimens, including the types.

The following specimens, other than the types, are in the collection: Nos. 18292-18352, ten miles west of Villa Victoria, in western part of México, September 1 and September 10, 1938, E. H. Taylor. No. 18353, twenty miles west of Guadalajara, Jalisco, September 11, 1938, R. Roberts. No. 21610, Mirador, Atzimba National Forest, Michoacán, September 3, 1939, E. H. Taylor.

*Microbatrachylus albolabris* sp. nov.

(Plate LVI; figs. A and B)

*Type.* EHT-HMS No. 6407, collected two miles west of Córdoba, Veracruz, August 20, 1936, by Edward H. Taylor.

*Paratypes.* EHT-HME No. 6407A, near Córdoba, 1936, by Radclyffe Roberts. Nos. 18802, Potrero Viejo, Veracruz, July 12, 1938; No. 18803, San Juan de Gracia, Veracruz, July 17, 1938, by E. H. Taylor.

*Diagnosis.* A small species lacking vomerine teeth and vocal sacs; tibiotarsal articulation reaching to back part of eye; nostril midway between eye and tip of snout; tympanum of female about three-fifths that of male, five-sixths diameter of eye; flat inguinal gland of greater extent than eye; outer metatarsal tubercle oval, three-fourths the length of first finger, about twice the size of outer tubercle; no tarsal fold; ventral disk terminating at femora; chin and entire venter without trace of granulation; a white stripe from near tip of snout below tympanum to above arm, separated from edge of lip by a broken, black line. A dark, irregularly-edged, middorsal stripe bordered by two gray-cream stripes; these in turn bordered by two grayish-black lines.

*Description of the type.* A small frog, the known maximum length less than 18 millimeters; head narrower than body, flattened; eyes not strongly salient dorsally; snout oval; nostril practically midway between eye and tip of snout; distance between nostrils (1.9 mm.) about three-fourths distance from eye to tip of snout (2.7 mm.); diameter of eye (2 mm.) greater than that of tympanum (1.25 mm.); width of upper eyelid (1.3 mm.) equal to interorbital width; canthal region somewhat rounded, the lores sloping abruptly, somewhat concave behind nostril; tongue longer than wide, the

posterior edge rounding, not notched behind, the posterior width about one-fourth greater than the anterior width, free for one-third its length; choanae small, lateral, completely concealed by projections of upper jaw when seen directly from below.

Arm short, laid forward the wrist does not reach tip of snout; first finger shorter than second; subarticular tubercles distinct, rounded, moderately salient; a large tubercle at base of first finger; a large, rounded, median palmar tubercle; no trace of an outer tubercle; five supernumerary tubercles on palm; tips of two outer fingers with disks having a terminal groove; the disks at least one-third wider than the width of the digit; those of inner fingers scarcely wider than digit; no trace of a web; a row of rounded tubercles on under surface of forearm; leg rather short, the tibiotarsal articulation reaching the posterior corner of the eye; disks on toes slightly larger than those on fingers, with a terminal groove; subarticular tubercles large, somewhat salient; only one or two supernumerary tubercles, these on the back part of sole; inner metatarsal tubercle oval, nearly three-fourths the length of the first toe; outer tubercle more than half as large as inner; when limbs are folded at right angles the heels overlap a little.

Skin above on head and body with tubercles and folds; a median hair-fine ridge from snout to anus; a pair of indefinite folds begin at eyelid in interorbital region, converge to a point on shoulders where they run parallel for a short distance, then they diverge, then converge, and run parallel for a distance. Again they diverge, and again converge and run more or less parallel to rump, where one or two larger tubercles are to be found; a discontinuous fold or row of tubercles begins behind eye and follows the dorsolateral region to groin; another indefinite row of tubercles runs back from the dim supratympanic folds; sides of body with other indistinct tubercles more or less in rows; the folds above tympanum not pronounced; the gland behind and below tympanum distinct, having characteristics of the gland in groin; latter large, flat, the minute glandules visible through skin; chin, breast, abdomen and the greater part of the underside of femora very smooth; a proximal area on ventral and posterior faces of femur granular. Ventral disk indicated by a transverse fold on breast and two curving lateral folds which converge and terminate medially on limbs.

*Color in life.* Above grayish-cream, with a slight pink or rose cast; top of head dark, inclosing a grayish spot, the anterior edge of which is trifoliate; two dark lines begin on orbital edge of upper lids, fuse on occiput and continue back to rump as a broad, irregu-

larly edged stripe occupying all the area between the median folds; a dorsolateral dark stripe borders the dorsolateral row of tubercles below; a dark, irregular stripe through lores, across tympanum, above arms to the side, its lower edge deep black; a white stripe beginning near tip of snout borders the dark stripe to side; a broken black line on the edge of lip; an ill-defined dark line on lower lip; chin, throat and venter immaculate greenish white; two or three black spots on anterior face of arm and one or two on posterior face; palm purplish; fingers strongly barred above; a brown stripe on anterior face of femur, darkest at knee; very indefinite bars on femur and tibia; sole and heel purplish; toes dimly barred above.

*Measurements in mm.* Snout to vent, 16.5; length of snout (median), 2; length of head, 5.4; width of head, 4.9; arm, 7.9; leg, 23.1; tibia, 7.3; foot, 10.

*Variation.* No. 18803 has been preserved in too weak a solution of the preserving fluid and has bloated slightly so that all trace of rugosities or folds on the body have disappeared. The color and markings are similar; the limbs are darker and the dorsal dark and light markings are less contrasted. No. 18802 has the dorsal cream stripes only faintly visible and narrower than in the type; in 6407A, the specimen has become brownish; there is a faint, light hair line in middorsal region, connecting with a similar transverse line on the back of the thighs which passes below anus.

Two specimens from Guerrero are tentatively referred to this species. They differ in certain points, but the median dorsal folds are similar, and a white stripe containing some scattered pigment is present on lip and lores, running back above and behind arm. Both specimens are larger, with proportionally larger outer metatarsal tubercles, which are somewhat squarish, their free edge directed inward. No. 6408 (1½ mi. N. of Mazatlán, Gro.) is a female with tympanum about two-thirds the diameter of eye; No. 21611 (Agua del Obispo, Gro.) is a male, the tympanum minutely less in diameter than the eye. In the female the borders of the ventral disk form very ample folds. The largest measures 17.8 mm.

*Comparisons.* This form differs from the white-lipped *Eleutherodactylus beatae* by the absence of a tarsal fold, or tarsal tubercles, larger tympanum and shorter legs. By the presence of the white stripe on the lip it differs from other members of this genus.

*Microbatrachylus oaxacae* sp. nov.

*Type.* EHT-HMS No. 18197, collected on Cerro San Felipe, near Oaxaca, Oaxaca, Mexico, August 18-22, 1938, by E. H. Taylor.



*Paratypes.* EHT-HMS Nos. 18188, 18189, 18191-18196, 18198, 18203, 18205-18207. Same data as type.

*Diagnosis.* A diminutive species with three palmar tubercles, the outer large, distinct or partly fused with the median; choanae not concealed under overhanging jaw when seen from below; digits not dilated; and indistinct parotoid gland above arm behind typanum; a small gland just posterior to axilla; inguinal black spots wanting; generally pinkish or rose color in life; sexual dimorphism not marked.

*Description of type.* Known maximum size 18.1 mm. (male). Head nearly as broad as body; snout rather oval; canthus rostralis distinct, but somewhat rounded; lores sloping broadly to lip; the loreal region slightly concave behind nostril; eyes not salient above; width of an eyelid (1.7 mm.) distinctly narrower than the interorbital distance (2.2 mm.); length of eye (2.2 mm.) greater than its distance from nostril, less than length of snout (2.8 mm.); nostril a little closer to tip of snout (1.3 mm.) than to eye (1.7 mm.); diameter of the circular tympanum (2.1 mm.) practically equal to that of eye.

Tongue much elongated (paratypes show a much shorter tongue), free for at least half its length, not or but slightly notched behind; no vocal sacs; no vomerine teeth; choanae lateral, not concealed by the projection of jaw when seen directly from below; area of palate anterior to choanae much reduced.

Arms short, brought forward the wrist fails to reach snout tip; first finger shorter than second; subarticular tubercles very large, rounding, as wide or nearly as wide as the digits; five small supernumerary tubercles on palm; three posterior palmar tubercles, the median largest, contiguous posteriorly with the outer palmar tubercle, or partly fused with it posteriorly; a dim fold under arm, elevated at two or three points with tubercles; small pads on tip of digits lacking a groove, not wider than the digit; legs long, the tibiotarsal articulation reaching tip of snout; limbs folded at right angles, the heels overlap two millimeters; outer metatarsal tubercle about two-thirds the length of first toe, moderately elevated, oval; outer more than half as large; toes with pads not or only minutely wider than toes; subarticular tubercles large, longer than wide, moderately elevated; a well-defined supernumerary tubercle on fourth toe between the two proximal tubercles; sole with several dimly indicated tubercles; no tarsal fold from inner tubercle; a row of tubercles run along outer side of tarsus from outer tubercle.

Skin above rugose, pustular, forming a pattern with indistinct folds and pustules; a pustular fold begins at posterior corner of eye,

runs back diagonally to a large tubercle on shoulder which is widely separated from its fellow; situated posterolaterally from this is another enlarged tubercle, which is continuous with a fold that runs posteriorly to groin, broken up into tubercles; beginning at the shoulder tubercles are two fine folds, one on each side, which tend to converge, then run parallel to each other, then diverge to join the outer row of tubercles. Arms finely pustulate, legs heavily pustulate, the largest pustules on the dark markings; sides pustulate or tubercular; a small (yellow) gland behind axilla and a larger, flat gland in groin; venter very dimly granular in the posterior half; throat and breast quite smooth; a broadly triangular, very distinct suction disk on venter, terminating posteriorly on thighs; a small parotoid above arm and a large tubercle back of lower part of tympanum.

*Color in life.* General ground color pink or roseate above; concealed parts of hind limbs pink; venter yellowish-white to ivory, with scattered, minute flecks of pigment forming a dim reticulation enclosing lighter spots; chin and throat darker; head grayish and black, with spots on lips; a loreal stripe, more or less distinct; dim, radiating lines on edge of eyelid above; a light gray bar between eyes, followed by a blackish bar; two x-shaped marks on shoulders; dim, dark marks on back; a dark spot above tympanum; limbs distinctly barred; palms, soles and undersurface of digits dark, the tubercles cream.

*Measurements in mm.* Snout to vent, 18.1; snout, 2.8; width of head, 7.3; length of head, 7.2; arm, 11.1; leg, 35.2; tibia, 11.4; foot, 15.

*Variation.* The series is very uniform in general characters, save that the dorsal pustular patterns may be dim. Females have smaller tympani, which are more or less oval, higher than wide—the longitudinal diameter about two-thirds of the eye, and its edge farther from the eye than in the males; the inguinal gland, and the parotoid glands, are usually smaller, and the latter a little less distinct than in the male. The size of the females in the collection is no greater than that of the males.

The closest relationship is apparently with *M. hobartsmithi*. The dorsal pattern of folds and pustules (tubercles) of that species is different; there is very great sexual dimorphism; the outer palmar tubercle is lacking; and the tibiotarsal articulation rarely reaches a slight distance beyond eye.

All the specimens were estimated to have been taken between an elevation of 7,000 and 8,000 feet. None were seen at lower eleva-

tions. All were taken on the ground among leaves. Three specimens of another small Eleutherodactylid were taken with these; they are believed to be the young of *E. mexicanus*. No adults of that form were taken.

*Microbatrachylus minimus* sp. nov.

(Plate LVI; figs. C, D)

*Type.* EHT-HMS, No. 6416, Agua del Obispo, Guerrero (km. 350) in pine forest, August 1, 1936, E. H. Taylor, coll.

*Paratypes.* EHT-HMS, Nos. 6411, 6413, 6415, Agua del Obispo, 3689 near Mazatlán, Guerrero, E. H. Taylor, coll.

*Diagnosis.* Small frogs; tympanum (of males) as large as eye; inguinal gland present; nostril nearer snout tip than eye; outer toes and fingers with widened disks; heel reaches middle of eye; no outer palmar tubercle; no postaxillary gland; a pair of broken, dorsolateral folds arising some distance behind eye; a second broken fold from above tympanum; lip spotted with black; lavender and purple above.

*Description of type.* A diminutive species (known maximum length for males, 15 mm.; for females, 19 mm.); head a little narrower than body, the eyes moderately prominent; eyelid (1.2 mm.) smaller than the interorbital distance (1.75 mm.); tympanum large, subcircular, longer than high, its greatest diameter (2 mm.) equal to eye (1.95 mm.); distance between nostril and eye (1.3 mm.) greater than the distance of nostril to tip of snout (.95 mm.); snout rounded at tip, the length, 2.2 mm.

Tongue rather thick, rounded anteriorly and posteriorly the sides more or less parallel, free for more than one-third of its length; no vomerine teeth; choanae small, lateral, not or but partly concealed when seen from below; no vocal sacs.

Arm brought forward the wrist reaches near the tip of snout; tip of two outer fingers dilated into disks, with a terminal groove; the inner fingers not wider than digit; subarticular tubercles large rounded; fine supernumerary tubercles on palm; two large palmar tubercles, the median one largest; the outer entirely wanting; a row of tubercles under forearm; a distinct tubercle or swelling at the wristfold; arm more or less rugose; when legs are folded at right angles to body the heels barely touch; tibiotarsal articulation reaches to middle of eye; digits of second, third and fourth toes dilated with pads having a terminal transverse groove; subarticular tubercles strong; supernumerary tubercles on the foot almost obsolete, their location indicated by cream spots; inner metatarsal tubercle large, salient, about two-thirds the length of first toe; outer metatarsal

tubercle small, one-fourth size of inner; tarsus lacking an inner fold, three small, indistinct tubercles on the outer side.

A broken irregular fold runs back dorsolaterally, limiting light dorsal coloration; region between very rugose and pustular, but no distinctive pattern can be discerned. A second broken fold runs on the side beginning above the tympanum; sides granular or tubercular as are eyelids; ventral disk well-developed, terminating on thighs; chin throat and all save posterior part of abdomen smooth; most of ventral surface of thighs smooth, but the strongly granular area in anal region encreases somewhat on the ventral surface; inguinal gland rather indistinct (distinct in paratypes); a parotoid gland above arm is not compact; a tubercle between arm and tympanum.

*Color in life.* Above dorsal surface light lavender, limited by the dorsolateral fold; the head lighter—the sides darker purplish (in alcohol the color becomes brownish), arms brownish-cream; lower arm and hand lavender, barred with purplish. Legs lavender barred with purplish; ventral surfaces cream with a peppering of pigment forming a very dim reticulation, enclosing rounded areas lacking pigment; lips with darker and lighter, more or less quadrangular spots; a dark bar from nostril, above tympanum and arm, becoming wider on side behind arm.

*Measurements in mm.* Snout to vent, 15; snout, 2.2; width of head, 5.3; length of head, 5.7; arm, 8; leg, 24; tibia, 7.6; foot, 9.8.

*Variation.* Most of the structural characters are constant; the skin is very rugose in all and occasionally a dim more or less distinct pattern is formed by the dorsal pustules. Usually two tubercles are present in the posterior part of the interorbital region. The largest specimen is a female and the colors are more intense.

*Remarks.* Two other forms of the genus occur in this region, *albolabris* and a form related to *hobartsmithi*. Further specimens of the latter will be necessary to determine its exact status. The specimens were all taken on the ground. The call is a weak chirp resembling an insect call more than that of an amphibian. These were heard both morning and late afternoon, as well as at night. I cannot distinguish the calls of the various forms.

*Hyla melanomma* sp. nov.

(Plate LVIII; figs. 1, 1a, 1b)

*Type.* EHT-HMS No. 21578; collected 7 miles east of Chilpancingo (Cuidad Bravos), Guerrero, Mexico, August 20, 1939; E. H. Taylor collector.

*Paratypes.* EHT-HMS Nos. 21545-21554, 21556-21558, 21560-21578; same locality and date; H. M. Smith and E. H. Taylor, collectors.

*Diagnosis.* A small hyla with a known maximum snout-to-vent length of 32 mm.; interorbital width one and three-fourths to twice the width of an eyelid; canthus rostralis distinct, lores sloping; greatest diameter of tympanum about two-thirds of length of eye; a slight axillary web; vomerine tooth groups lying between the anterior ends of choanae; a very strong tarsal fold; heel brought forward reaches eye.

*Description of the type.* Head rather broad, with relatively small eyes, the distance between the orbits (4.2 mm.) nearly twice the width of an eyelid (2.15 mm.); length of eye (3.4 mm.) reaching anterior edge of nostril; distance between nostrils equals width of eyelid; snout a rather pointed oval with little or no depression between nostrils; canthus distinct, but slightly rounded; lores sloping; the eyes seen from above extending beyond profile of jaw; tympanum distinct, the upper edge overhung by a slightly developed fold; tip of snout extending about 1.4 mm. beyond lower jaw; tongue about as wide as long, not or but very slightly notched behind, and with a very narrow free posterior edge; vomerine teeth in two transverse groups of six teeth, the anterior edges of the raised area extending slightly anterior to a line drawn between the anterior edges of the choanae; latter moderately large, oval.

Hand with rather large disks which are distinctly smaller than tympanum; outer digits half webbed or slightly less; first finger narrowed behind the disk; distal subarticular tubercles large, well-defined, that of outer finger single; proximal digits small; palmar tubercles tripartite, that on base of first finger elongate, not strongly differentiated; numerous indistinct tubercles or granules on palm; a row of tubercles under forearm; hind limbs relatively short, the tibiotarsal articulation reaching middle of eye; the heels overlap when limbs are folded at right angles to body; toes more than three-fourths webbed, the membrane reaching to near the disks; toe disks smaller than those on outer fingers; outer metatarsal tubercle large, distinct, rather diagonal in position; outer tubercle small, less distinct; a very strong tarsal fold extends to heel, running slightly diagonally; anal flap short, rather narrow, with a slight median groove below it; skin on dorsal surfaces smooth; chin, throat and breast with dim, flattened granules; venter, sides and under side of femur strongly granular; a slight elevation behind eyes; axillary web distinct but small.

*Color in life.* Above, light olive green, lighter on side and above limbs; below flesh white; when preserved, the color is light flesh with a fine peppering of pigment some of which segregates to make minute flecks; a fine, equally distributed peppering of pigment on limbs, on both dorsal and posterior faces, visible under a lens; the eyeball is very black and seen through the eyelid make the eyelid appear black; a slightly darker area or spot between eyes.

*Measurements.* Snout to vent, 31.2 mm.; length of snout, 5.1 mm.; snout to arm, 11 mm.; width of head, 11 mm.; length of head, 10.6 mm.; arm, 16.4 mm.; leg, 46 mm.; tibia, 15.5 mm.; foot, 20.8 mm.

*Variation.* Of the five adult paratypes three were colored like the type; two were purplish above save in the rump region, with a darker area on the tip of the snout; the darker area between the eyes is more pronounced in most of the specimens and there is slightly more pigment at the tip of the snout; some of the specimens have a slight depression between the nostrils; the smallest specimen measures 30 mm.; the largest, 32 mm.; the proportional measurements are very close to those of the type. All are females.

The young specimens taken at the same time differ from the adults in the shape of the head, the snout being shorter, and the tympanum is concealed. In life they vary from olive to leaf green, while some showed a purplish coloration above.

*Remarks.* All the specimens were taken from bromelias in the low trees growing along a small stream. The green and olive coloration matched the green shades of the outer sides of the bromelias, while the purplish markings were similar to the purplish coloration of the inner basal parts of the leaves. Whether the males have vocal sacs or nuptial callosities is not known. I do not find sacs present in any of the young, all of which are recently transformed. This is not conclusive evidence that this character is absent.

I am uncertain as to the relationship of this form. Two other Mexican *Hylas* are known to live in the bromelias—*Hyla bromeliana* and *Hyla arboreoscandens*. The latter differs in being a very much larger frog with yellow lateral spots; it has a sharper canthus rostralis and strongly defined nuptial callosities with minute nuptial spines on first and second fingers. From *Hyla bromeliana* it differs in having much smaller eyes, a wider interorbital region, and in the absence of the characteristic bands on the limbs.

*Hyla arborescandens* Taylor

*Hyla arborescandens* Taylor, Univ. Kansas Sci. Bull., vol. 25, July 10, 1938, pp. 388-391, fig. 1 (type locality 3 km. southwest of Acultzingo, Veraacruz).

The type locality of this species was revisited on August 19 and 20, 1939, and a series of specimens were obtained from bromelias. The males agree with the type in having a rather sharp snout. The inner edge of the second finger has a row of minute spinules running to near the terminal pad, and occasionally spinules occur on the inner edge of the third finger. This character was overlooked in the type. The characteristic marking of the hind limbs is present in all the specimens, but more distinct in some than in others. The fold which runs from the eye, above the tympanum, terminates above the arm in a parotoid gland; a more or less distinct fold follows the parotoid and this may be thickened and glandular; the interorbital distance is much larger than the width of the eyelid.

The two females in the lot are distinctly larger than males and both are filled with nearly ripe eggs. In one the color was dark olive to olive-brown above, with small, indistinct, darker areas above; and three or four yellowish spots along the sides; the other was light olive with a large quadrangular black spot on neck, with fine darker flecks scattered on back and dorsal surfaces of limbs. The snout is not pointed but somewhat truncate, and the lower jaw is more rounded, and the nostrils are almost directly above edges of lip. The yellow spots on the sides are replaced with a fine, rather indistinct reticulation.

Whether the eggs are laid in the bromelias or not I cannot say, but it is probable that they are. The breeding season would appear to be much later than that of *Hyla miotympanum*. Many of the tadpoles of the latter had already transformed at this time. In the numerous plants examined, no eggs or tadpoles were found. The snout to vent measurement of the largest male was 38 mm.; of the largest female, 49 mm.

*Hyla erythromma* Taylor

*Hyla erythromma* Taylor, Proc. Biol. Soc. Wash., vol. 50, April 21, 1937, pp. 48-50, pl. 2, fig. 1 (type locality, Agua del Obispo, Guerrero).

This species, discovered in 1936, was described from a single female specimen. With the hope of obtaining more specimens in order to establish its legitimacy on a firmer basis, Dr. Hobart M. Smith and I revisited the spot where I had obtained the type. At a point about 200 meters from here in a rivulet arising from the Agua del

Obispo spring I found six specimens of a small frog in a bush overhanging the rivulet. They were calling, but the low voices could be heard at a distance of only a few meters. Doctor Smith obtained one in a tree some thirty meters farther up the stream.

On examination all of the specimens proved to be males and all had an extraordinary lateral gland extending nearly the distance between axilla and groin and reaching below like two closely pressed flaps on the abdomen. All had brownish-red eyes.

A comparison of these specimens with the type of *erythromma* leads me to the belief that they are the males of that species despite the differences that obtain. There is no evidence of the gland in the type. The skin is very smooth, while in the male specimens the skin is distinctly corrugated; the webbing between the digits is very slightly more extensive in the males; the lateral markings are more distinct and they are much more heavily pigmented above; the ventral part of the glands are yellowish with more or less dark pigment. The entire ventral part of the abdomen of the female is lacking in pigment and it is entirely covered with large granules instead of only the area between the glands as in the males.

In life the males were largely green, or olive of varying shades. Certain of the specimens showed a brownish reticulation or mottling on the olive. The sides were cream, with spots, blotches or mottling of brown or olive. A diagonal cream stripe was present on the base of upper arm, while the axilla was cream. Below, the belly was creamy white to yellowish-cream. Some specimens had a few brownish spots on chin or throat and in front of the insertion of the arm.

That I am dealing here with two species is not beyond possibility. However, only larger series can settle the point beyond doubt. The small *Hyla pinorum* Taylor, also taken in this immediate locality in 1936, was not rediscovered, but there is no possibility of these specimens belonging to that species.

The first finger has a wider base than in the type and its dorsal surface is beset with a group of twenty to thirty black, horny spines, very much larger and not closely approximated as in such forms as *Hyla lafrentzi*, *arborescandens* and *bistincta*.



*Hyla forbesi* sp. nov.

(Plate LVIII; figs. 1, 1a 1b)

*Type.* EHT-HMS, No. 22276; collected on a mountain three miles southwest of Acultzingo, Veracruz, August 27, 1939, by Dyfrigg McH. Forbes.

*Diagnosis.* A medium-sized hyla (known snout to vent length, 45 mm.) with very large, salient eyes, the eyelid wider than interorbital distance; tympanum concealed under skin, faintly indicated, measuring about one-third of eye length, its surface directed upward; canthus sharp; an arched glandular fold is continuous with the fluted anal flap; a small web between fingers; toes about three-fourths webbed; no outer metatarsal tubercle; tarsal fold low, indistinct; vomerine tooth group large, between small choanae which are partially concealed by a palatal ridge; a pectoral fold; chin and breast lacking granules; abdomen strongly granular.

*Description of the type.* Female with abdomen distended with eggs. Head moderate, narrower than the distended body; eyes very large, very strongly salient, seen from above they extend strongly beyond profile of jaws; eye as long as snout (5 mm.); nostrils nearly terminal, the snout projecting about 1.4 mm. beyond mouth; canthus rostralis sharp; projected lines of canthi intersecting on the tip of the snout; width of an eyelid (4 mm.) greater than the interorbital width (3.65 mm.); distance between nares 3.2 mm.; region about angle of mouth projects somewhat from side of head so that the tympanic region is almost entirely visible from above; tympanum covered with skin, its outline dimly visible, its diameter (1.6 mm.) about one-third of the length of the exposed part of eye ball; lores almost vertical.

Tongue very wide, circular, papillate, definitely nicked posteriorly, free for one-third of its length; choanae small, each with an anterior ridge which partially conceals the opening; vomerine teeth bordering the posterior edge of a raised region which is three times the size of the visible choanal opening; these areas lie between the choanae and extend anteriorly to their anterior level, and posteriorly to their posterior level.

Skin above smooth (under the lens only very faint corrugation is discernible); edge of eyelid somewhat thickened; a well-defined supratympanic fold from eye to above arm; neck constricted behind angle of jaws; sides with indistinct flattened granules; granules on chin wanting; a pectoral fold present; abdomen strongly granular;

ventral surface of femur and the lower part of its posterior face granulate, the granules becoming larger and reaching higher below anus; anal flap fluted, continuous with an arched glandular fold. Skin on limbs smooth; hand with a small but distinct web, the edges of web continued on fingers as narrow fringes; terminal pads large, the diameter of that on outer finger about 3 mm. wide; subarticular tubercles large, rounded, that on outer finger not bifid; a large palmar tubercle, more or less divided, the anterior part largest and rounded; a dim row of tubercles on underside of forearm and scattered supernumerary tubercles on hand; tibiotarsal articulation reaching anterior edge of eye; foot about three-fourths webbed; subarticular tubercles well-developed; numerous supernumerary tubercles which extend also onto sole; inner metatarsal tubercle rather large, with a small adjoined tubercle on its inner border; outer tubercle apparently wanting; tarsal fold dim, with indication of small pustules.

*Color.* Top and sides of head and anterior part of body, blackish-gray; posterior part of back shows very small, indistinct spots darker than the general color; dorsal surface of arms and fingers uniform dark; of legs and toes, mottled blackish-gray; belly and concealed surfaces of arms and legs, whitish; chin heavily pigmented with blackish-gray; under surface of knee dark; sides cream, with some dark reticulations and spots; undersurfaces of hands and feet more or less pigmented, posterior surface of thigh cream, strongly flecked and reticulated with darker color.

*Measurements in mm.* Snout to vent, 45; tip of snout to eye, 6.5; width of head, 14; length of head, 12; arm, 30; leg, 71; tibia, 22.5; foot, 33.5.

*Remarks.* Lacking knowledge of the characters of the males as pertains to the presence or absence of vocal sacs, and the nuptial armature of the first finger, I find it difficult to determine the relationship of the species. The presence of the arched anal fold is unique; the upturned face of the tympanic region (which does not appear to be due to distortion) is unusual. The size of the vomerine tooth areas is larger proportionally than in other known Mexican species.

In the type locality, *Hyla arborescendens* and *Hyla miotympanum* also occur. From the former it may be distinguished by the narrower interorbital distance, the larger eye and the smaller tympanum which is partly concealed. *Hyla miotympanum* differs from it in having a broadly rounded and flattened snout, the nostrils not

terminal; the lores are not vertical and the canthus rostralis is broadly rounded. The color in life was probably some shade of dark green above.

I take pleasure in naming the species for its discoverer, Mr. Dyfrig McHattie Forbes, of Potrero Viejo, Veracruz, my host on numerous occasions, who is an ardent collector and enthusiastic student of Mexican herpetology.

#### HYPOPACHUS Keferstein

*Hypopachus* Keferstein, Nachricht ges. Gottingen, 1867, p. 351 (type species, *Hypopachus seebachii* Keferstein = *Engystoma variolosum* Cope); Parker, A Monograph of the Frogs of the family Microhylidae 1934, p. 110. (See this paper for more complete synonymy.)

Parker's monograph recognizes five forms of this genus, as follows: (1) *Hypopachus incrassatus* Cope (Paraguay, S. E. Bolivia, S. W. and N. W. Brazil); (2) *H. inguinalis* Cope (Guatemala); (3) *H. variolosus* (Cope) (Costa Rica); (4) *H. cuneus* Cope (Texas); (5) *H. oxyrhinus* Boulenger (Sinaloa, Jalisco, and Michoacán in Mexico; Guatemala). Since its publication, *H. parkeri* Wettstein has been described from Brazil; *H. barberi* Schmidt and *H. globulosus* Schmidt from Guatemala.

*Description.* "Prevomere divided, the postchoanal portion absent; palatine absent. Clavicles and procoracoids present, almost straight, reaching the midline of the girdle and the scapulae; omosternum absent; sternum cartilaginous. Vertebral column diplasiocoelous. Terminal phalanges simple."

"Pupil round or rhomboidal. Tongue large, oval, entire and half free behind. Two smooth dermal ridges across the palate in front of the pharynx, the anterior much shorter than the posterior. Digits not dilated. In all the known species the tympanum is hidden, the first finger shorter than the second and the third toe longer than the fifth." (From Parker *loc. cit.*)

Kellogg, 1932, treating of the Mexican species of the genus, gives only *Hypopachus variolosus* (Cope). He places *H. oxyrhinus* Boulenger as a synonym of *variolosus*.

He lists the type of *H. oxyrhinus* in the British Museum; three specimens in the U. S. National Museum from Guadalajara and one from Arriba, Costa Rica (the latter probably properly associated with *H. variolosus*) and one from Ocatlan, Jalisco, in the American Museum of Natural History. While recognizing *H. cuneus* Cope as a legitimate species, he had seen no Mexican specimens of that species.

Parker, 1934, records *H. oxyrhinus* as follows: The cotypes (2) from Presidio de Mazatlán, Sinaloa; 1 specimen, San Salvador,

Michoacán, 2,500 ft.; 1 specimen, Buena Vista, Michoacán, 2,000 ft.; 1 specimen, Cofradia, Michoacán, 700 ft. He lists a half-grown specimen in the Mus. Vienna, from Coban, Vera Paz, Guatemala.

The material on which the present report is based consists of more than 250 specimens of the genus and 6 species and subspecies are recognized. The localities are scattered widely in the Republic. No specimens are known from the northern or eastern two-thirds of the plateau. On the plateau it is confined to the southwestern region. It occurs in lowlands everywhere except to the northwest, in northern Sinaloa and Sonora. The genus is unknown in Baja California.

Groups of specimens from Chapala, and Zapotiltic Jalisco; and Queseria, Colima; offer certain problems, and require further study. A part of these from the west coast belong to *H. oxyrhinus* Boulenger. I wish to acknowledge the aid of Mr. H. W. Parker of the British Museum for his kindness in examining specimens.

*Hypopachus cuneus cuneus* Cope

(Plate LXII, fig. A; Plate LXIII, figs. 7, 7a)

*Hypopachus cuneus* Cope, U. S. Nat. Mus. Bull., No. 34 1889, pp. 388-389, fig. 98 (type description; type locality "San Diego in Nueces County," Texas).

This species, originally discovered on the extreme northern border of its known range, has been traced some distance into the eastern coastal region of Mexico. The following specimens are present in the collection: EHT-HMS Nos. 1094-1097, near Forlon, Tamaulipas, Mexico, August 4, 1934; H. M. Smith-David Dunkle collectors. These are the first recorded specimens from Mexico. Aside from the Mexican specimens the following Texas specimens have been available: EHT-HMS Nos. 1032-1033, 13 mi. S. E. Rio Grande City, Texas, September 6, 1932, Taylor and Smith; K. U. Nos. 9886-9891, San Diego, Duval county, Texas, July 3, 1930, Taylor; K. U. No. 9885, Cameron county, Texas, July 3, 1930, Taylor.

This subspecies is distinguished by the almost complete loss of the digital web on foot in both sexes; relatively shorter legs; small hands and feet; absence of any clearly defined reticular pattern on the ventral surface.

Tongue free for about half its length. Anterior dermal ridge (fold) slightly curved; posterior ridge followed by parallel dermal folds running longitudinally; on each side laterally, in older specimens, these folds may begin on a level with the posterior edge of the anterior ridge; choanae large, when seen from ventral view,

nearly two-thirds of the openings concealed by an overhanging shelf. Male with vocal sac.

The coloration of the Mexican specimens is an indefinite olive. The pattern on the back consists of an inverted V, on the shoulders; the two sides of the latter then continue back parallel for a short distance then diverge to the groin. This figure is outlined with a series of more or less distinct, irregular black dots or spots; a row of similar spots begins behind eye and continues to groin. The area between this and the median pattern is a trifle lighter than color within the figure. The groin has one or two irregular ocellated darker spots which may extend on the proximal dorsal and anterior face of femur as a continuous or broken stripe; femur, tibia and foot each with bands or dots of black which tend to form a continu-

Measurements in mm. of *Hypopachus cuneus cuneus* Cope

Museum .....	KU	EHT-HMS	EHT-HMS	EHT-HMS	EHT-HMS	EHT-HMS	EHT-HMS
Number.....	9890	1032	1096	1095	1094	9885	1097
Sex.....	♀	♂	♂	♀	♀	♂	♀
Snout to vent.....	40.0	39.2	38.5	35.3	34.5	34.0	33.0
Snout to occipital fold.....	6.2	5.6	5.1	5.1	5.0	5.2	0.0
Head width at groove across jaws.....	12.0	11.0	9.2	9.7	9.4	9.8	8.6
Eye length.....	4.2	3.6	3.5	3.4	3.35	3.5	3.2
Eye to tip of snout.....	4.2	3.5	3.5	3.4	3.35	3.5	3.1
Length of snout.....	3.2	3.0	2.5	2.56	2.3	2.2	2.3
Snout beyond mouth.....	1.7	1.9	1.9	1.7	1.8	2.0	1.9
Eye to nostril.....	2.6	1.9	1.9	1.6	1.7	2.0	1.9
Width of eyelid.....	3.0	2.4	2.1	2.0	2.0	2.5	2.0
Interorbital width.....	4.1	3.7	3.2	3.6	3.6	3.6	3.3
First finger.....	2.5	2.2	2.3	2.5	2.4	2.8	2.3
Second finger.....	5.0	3.8	3.3	3.2	3.2	4.2	3.5
Third finger.....	7.0	6.4	5.5	7.1	5.25	5.8	5.4
Fourth finger.....	3.6	3.0	3.0	2.9	2.7	2.7	3.0
Hand and longest finger.....	11.45	11.1	9.4	10.2	9.7	10.0	9.2
Arm.....	22.6	20.0	19.0	21.9	18.9	19.8	19.0
Leg.....	46.2	46.0	43.2	46.0	41.2	43.0	42.3
Foot from heel.....	20.8	20.3	19.2	21.0	19.0	19.2	19.3
Femur.....	14.2	14.3	13.0	13.5	12.2	12.2	12.2
Tibia.....	12.0	12.1	12.0	12.0	10.2	12.0	11.6
Axilla to groin.....	23.0	20.0	18.2	16.0	15.0	17.3	14.0
Heels separated when folded.....	1.5	1.5	1.3	1.8	1.5	1.5	1.4

ous pattern when the limb is folded; the space between the bands reddish or yellowish tan.

No. 1094 has a very fine light tan reticulum scarcely discernible on ventral surface. The chin is powdered with cinnamon.

No. 1097 is yellowish-white with no trace of markings; arm with traces of bands. The hair fine median line is present; in all there is also a trace of a median line on chin and throat, and one beginning above anus follows an irregular course back of the femur and tibia on the heel. One specimen from Brownsville and one from San Diego shows more lateral spotting which encroaches somewhat on the abdomen; light line behind and below eye not black bordered

*Hypopachus cuneus nigroreticulatus* subsp. nov.

(Plate LIX)

*Type.* EHT-HMS, No. 12605, adult female, Encarnación, Campeche, Mexico; collected by Hobart M. Smith, October 1, 1936.

*Paratypes.* EHT-HMS, Nos. 12594-12604, 12612, 12614-12655, Encarnación, Campeche, October 1-10, 1936; 12656-12674, 12675-12690, Encarnación, Campeche, October 11-14, 1936; 12606-16611, Tres Brazos, Campeche, September 19, 1936; 12691, Pital, Campeche, October 16, 1931; 12613 Chichen Itzá, Yucatán, August 25, 1936—all collected by Hobart M. Smith.

*Diagnosis.* Related to *Hypopachus cuneus cuneus*, but differs in having the markings on the throat of a different character from those on abdomen; a heavy black reticulation covering abdominal region and underside of limbs; sides of body black with yellow spots or reticulations; dorsal surface of upper arm light, usually cream color and dorsal part of femur with a light ground color, cream or pinkish cream in life.

*Description of the type.* Snout narrow, pointed, its anterior outline oval when seen from above; canthal region rounded, the sides of the snout slightly oblique, with a very slight depression in loreal region; snout projects beyond the mouth nearly half its length; eye large, 4 mm. in length; length of snout, 2.3 mm.; eye to tip of snout, 3.9 mm.; eyelid, 2.1 mm.; interorbital width, 4 mm.; snout to occipital fold, 5.6 mm.; tongue broad, rounded behind, free for more than half its length. Palatal ridges distinct, the anterior shorter than posterior, slightly curved; second higher, broader, transversely longer than the preceding ridge; behind the second the derm is arranged in longitudinal, plicate folds, which at sides push forward along the end of the second ridge; choanae large, but when viewed

directly from below the overhanging ridge conceals three-fourths of the openings; openings of the Eustacian tubes half as large as choanae, placed opposite the posterior edge of the first dermal ridge; fold across the occiput moderately distinct; fold across chin well defined; fold on breast not distinguishable; a thickened fold from eye to arm, bordered by a deep groove; this groove is intersected by the one from the chin fold, which crosses the jaw angle at a point some distance behind the eye.

Arm moderately long, brought forward, the hand extends beyond the snout; three well-developed palmar tubercles, the median extending more forward than other two, outer largest, inner smallest; second and fourth fingers extend an equal distance forward, reaching the anterior edge of the distal subarticular tubercle of the third finger; first finger reaches only as far forward as the proximal tubercle of the third finger.

Leg brought forward the inner metatarsal tubercle reaches at least to the posterior corner of eye; when legs are folded at right angles to the body the heels are separated by five millimeters; outer metatarsal tubercle more than half as large as inner, narrowly separated from inner; latter with its greatest length distinctly less than length of the first toe, compressed, strongly elevated; outer tubercle much less elevated; no web between digits (a trace only in males).

*Color.* Above nearly uniform lavender-brown, slightly more olive in dorsolateral region; the dorsal pattern obsolete, evidenced only by an H-shaped group of black dots above shoulders; a hair-fine line from tip of snout to above anus; a dark stripe from tip of snout to groin, broken more or less on sides; area on side of head below eye slightly pigmented and a white or cream stripe present from eye to insertion of arm; dorsal face of limbs light, remainder with dark spots, stripes or reticulations; a group of spots on posterior part of back and inguinal region; a rather large black inguinal spot; bars on dorsal surface of legs represented by small black spots; under surface of feet, except tips of toes, dark; chin dull lavender with a very fine lighter reticulation; belly cream with a heavy black reticulation; a hair-fine line from tip of chin to breast, and from its posterior end two broader cream lines run forward to arm insertions.

*Variations.* Most of the differences observable are those due to age. One or two very young specimens have the ventral reticulation dim; in some specimens the typical (generic) dorsal pattern is rather clearly defined and is outlined with darker. The dorsal ground color varies through grays, gray-browns, lavenders, to reddish purple; the

ventral color is whitish to cream; the ventral reticulation varies from dark gray to deep black. The single specimen from Chichen Itzá, Yucatán, has the dorsal surface an immaculate, dark lavender with a single groin spot; no dorsal limb markings; throat deep lavender with fine lighter flecking; and the ventral reticulation of the abdomen is very dim. Males have a vocal sac, and have small tubercles scattered on dorsal surface of body and limbs; tubercles also present on chin and on lateral edges of digits.

*Measurements in mm.* Snout to vent, 43.4; snout length, 2.3; head width, 13; head length, 11.3; arm, 23.1; leg, 49; tibia, 16; foot, 22.8.

*Remarks.* It is a surprising fact that more than ninety-five percent of this large series of specimens are females; in the other species of *Hypopachus*, I have from Mexico, the males strongly predominate.

*Hypopachus ovis* sp. nov.

(Plate LXII; fig. B)

*Type.* EHT-HMS No. 1050, adult male, collected at Tepic, Nayarit, Mexico, July 31, 1934, by E. H. Taylor.

*Paratypes.* EHT-HMS Nos. 1034-1049, 1051-1093, topotypes; same data.

*Diagnosis.* A small species, known maximum size 36.5 mm., with a dorsal pattern clearly defined; sides dark with small cream spots; limb brought forward the inner metatarsal tubercle fails to reach eye; males with toes one-fourth to one-fifth webbed, the web continued as a slight fringe on side of digits; width of eyelid about half of interorbital distance; snout projects but little beyond mouth; skin above roughly corrugated; males with fine, pearly tubercles on dorsal and lateral surfaces, posterior face of leg, on chin and lateral digital fringes. Venter grayish with dim, lighter spots.

*Description of the type.* Snout narrow, pointed, projecting somewhat beyond the mouth; canthal region rounded, lores oblique, with a distinct depression between nostril and lower part of eye; line of mouth does not reach as far posteriorly as the back of eye; snout projects beyond mouth scarcely more than one-third its length; eye, 3.5 mm. long; snout, 2.9 mm.; eye to tip of snout, 3.1 mm.; eyelid, 2 mm. wide; interorbital width, 3.5 mm.; snout to occipital fold, 5 mm.; tongue elongate, free for half its length; anterior dermal ridge on palate separated from posterior by 1.4 mm.; posterior ridge wider and transversely longer, followed by longitudinal plicae which push up farther forward at ends of ridge; openings of eustachian tubes round, about one-half the area of the choanae, which are elongate and when viewed from below, are nearly half concealed by the over-



hanging shelf; openings of eustachian tubes are opposite the space between dermal ridges; a strong dermal fold passes across head and down to about lower level of eye then passes back to near insertion of arm, the skin of the fold being much thickened laterally and preceded by a groove; a vertical groove crosses near angle of jaws, but cannot be traced across chin; no chinfold and no fold across breast. Skin of breast and anterior abdominal region thickened, into an abdominal glandular area (not so in females); skin of the dorsal surface strongly rugose, the summits of the small pustules each surmounted by a pearly tubercle on all dorsal surfaces, very few on head; a few tubercles on chin and along the lateral edges of digits; arm moderate, brought forward the hand extends beyond the snout; three palmar callosities, the two outer largest, the median extending more forward than other two; fourth finger extends slightly farther forward than the second, neither extends beyond the distal tubercles of the third finger; inner metatarsal tubercles fail to reach eye when leg is brought forward; metatarsal tubercles more or less compressed, the length of the inner distinctly less than distance between tubercle and end of first toe, longer than free part of first toe; toes one-fifth to one-fourth webbed in males (less in females), the web continued as a narrow fringe for some distance along the sides of the digits, the edge surmounted by a row of spinelike tubercles.

*Coloration.* Above brown with a median darker pattern edged with black, beginning between eyes and extending back in a symmetrical pattern to posterior end of body; sides lavender-brown, darker than adjoining region of the back, with small cream flecks; lower on sides, larger, rounding, cream spots; femur and tibia crossed by a black-edged stripe, continuous when leg is folded; arm with some darker areas and a light area on the dorsal surface of upper arm; chin grayish-black (males); abdomen, breast, and under side of limbs with a reticulum of lavender pigment enclosing lighter areas so sparse that the abdomen appears nearly white; posterior face of femur and tibia, brown with cream spots; under surface of hands and feet lavender, except tips of digits and the metatarsal tubercles which are cream.

*Variation.* The large series is uniform in most structural characters and in size. There are slight differences in proportion as shown in the table of measurements.

*Remarks.* The series was obtained at night in the environs of Tepic in a small pasture. Most of the specimens were calling from tiny puddles of water that had formed in hoofprints.

Measurements of *Hypopachus ovis*, sp. nov.

Museum.....	EHT- HMS	EHT- HMS	EHT- HMS	EHT- HMS	EHT- HMS	EHT- HMS	EHT- HMS	EHT- HMS
Number.....	1057	1075	1059	1071	1073	1044	1070	1050
Sex.....	♂	♂	♀	♂	♂	♂	♀	♂
Snout to vent.....	36.5	36.5	36.0	35.5	35.0	34.5	31.0	35.0
Snout to occipital fold.....	5.3	5.7	5.6	5.0	5.3	5.0	5.0	5.0
Head width at groove across jaw.....	10.0	10.7	10.7	10.4	10.2	10.0	9.6	10.2
Eye length.....	3.6	3.8	3.8	3.5	3.8	3.6	3.2	3.5
Eye to tip of snout.....	3.1	3.5	3.3	3.3	3.1	3.0	3.0	3.1
Length of snout.....	3.0	2.6	3.0	3.0	2.7	2.8	2.5	2.9
Snout beyond mouth.....	1.4	1.5	1.5	1.4	1.6	1.4	1.4	1.0
Eye to nostril.....	1.6	1.6	1.9	2.0	1.7	1.9	1.6	2.0
Width of eyelid.....	1.9	2.0	1.9	1.7	1.9	1.8	2.0	2.0
Interorbital width.....	3.9	4.0	3.8	3.6	3.9	4.0	4.3	3.5
First finger.....	2.5	2.8	2.8	2.8	2.6	2.9	2.4	2.5
Second finger.....	2.9	3.3	3.6	3.75	3.1	3.4	3.1	3.1
Third finger.....	5.3	5.4	5.8	5.5	5.3	6.0	5.2	5.3
Fourth finger.....	3.1	3.1	3.1	3.0	3.2	3.5	3.0	3.1
Hand and longest finger.....	9.2	9.4	10.3	10.0	9.5	9.9	8.7	8.9
Arm.....	21.0	19.0	20.3	20.0	21.0	19.2	18.5	20.0
Leg.....	39.8	42.0	42.2	39.0	40.3	41.0	38.3	39.0
Foot.....	16.2	18.3	18.0	18.5	19.0	19.0	17.0	0.0
Femur.....	11.7	11.3	12.5	10.7	11.0	10.0	11.2	0.0
Axilla to groin.....	18.0	18.0	18.0	19.0	20.0	20.0	14.0	0.0
Tibia.....	11.3	12.4	11.6	10.0	11.0	12.0	9.8	0.0
Heels separated when folded.....	3.0	3.0	2.3	2.0	3.0	2.7	2.0	0.0

*Hypopachus alboventer* sp. nov.

(Plates LX, LXIII; figs. 3, 3a)

*Type.* EHT-HMS No. 18615; eight miles east of Cuernavaca, Mor. June 20, 1938. E. H. Taylor coll.

*Paratypes.* EHT-HMS Nos. 6552-6555, km. 133, near Huajintlán Mor. July 14, 1936; 18611-18614; 18616-18621, two to eight miles north and east of Cuernavaca, June 17-20, 1938. E. H. Taylor.

*Diagnosis.* A medium sized species, maximum known length 44 mm. (♀); males with a well-defined glandular region on breast extending onto abdominal region, the posterior border definite; absent in females; toes nearly half webbed, in males the membranes somewhat excised, the toes bordered almost to tip with dermal fringes;

female with toes about one-fourth webbed; length of inner tubercle four-fifths of the inner toe; venter cream white without reticulation or ocelli; dorsal pattern somewhat similar to *H. ovis*, but lacking ventral markings with more web on feet in males. Limb brought forward, tibiotarsal articulation reaches about to arm insertion, the inner metatarsal tubercle fails to reach eye.

*Description of type.* Snout narrow, short, truncate, extending beyond line of mouth, the nostrils almost terminal; loreal region sloping vertically; canthus rostralis indistinct rounding; length of eye (3.1 mm.) minutely longer than snout; diameter of nostril large contained in its distance from eye about two and one-half times; width of an eyelid (2.3 mm.) less than half of the interorbital width (4.8 mm.); no trace of tympanum; a strong fold from corner of eye to arm; another fold passes across jaw angle and across the throat; line of mouth does not reach back as far as posterior corner of eye.

Tongue elongate, free for half its length, nearly as wide posteriorly as anteriorly; anterior palatal ridge distinct, separated from the larger posterior ridge by a distance equal to half its length; posterior ridge higher, prominent, followed by regular plicae; choanae large, at anterior end of buccal cavity, concealed almost completely by upper jaw when seen from below; hand with large subarticular tubercles; three palmar tubercles, that on base of first finger smallest, median largest, placed farther forward than other two. Legs short, the tibiotarsal articulation reaches to near arm insertion; when folded at right angles to body, heels separated by from four to five millimeters; toes about one-third webbed; the dermal fringes on toes narrow, inconspicuous; subarticular tubercles rather small; no supernumerary tubercles; inner metatarsal tubercle very large, strongly salient, the inner free edge somewhat compressed, the outline seen in profile forms a half circle; outer metatarsal tubercle smaller, its free edge pointing anteriorly, a little more than half size of inner and separated from it by a space less than half its length.

Skin thick rugose; the pustules, small, distinct rather flattened on back and sides, arms smooth; proximal part of the posterior face of femur with fine pearly spines; a few on dorsal surface of tibia; ventral face of femur with a few, large, flattened granules; a slight fold behind eyes; head quite smooth; anterior face of femur and tibia smooth.

*Color.* Deep purplish lavender above with a black edged, darker area extending from behind eyes to back of body, widening gradually, the outer edges irregular; the black border of this area crosses

the limbs, making a continuous line when limbs are folded; an inconspicuous inguinal, dark spot; chin and throat with a heavy peppering of lavender-brown pigment; belly rather cream with a fine peppering of pigment discernible under a lens; tips of digits and the tubercles pure cream; heel, soles and palms purplish; posterior face of femur lavender with some blackish reticulation; a very tiny white line on fold back of mouth angle.

*Measurements of type and paratype (No. 18619 ♂)* in mm. Snout to vent, 44, 37.8; snout length, 4, 3.2; width of head, 13.8, 13.4; length of head, 9.8, 10; arm, 26.5, 22.5; leg, 50, 46; tibia, 15.8, 15.2; foot, 25.2, 24.

*Variation.* The type series is constant for the general structural characters; the dorsal marking may be more distinct than type or almost obsolete; males differ in having a fairly well-defined thickened glandular area on breast which exudes a viscous fluid that dries into a rubberlike sheet. It probably serves to assist the male in clasping the female. The feet of the males have much more webbing and the dermal fringes are usually distinct to the narrow tips of the toes. The edges of the digits are beset with minute spinules of pearl color; a few scattered spinules on back, sides and venter; those on posterior face of femur are absent; most of the specimens have a deep purplish spot back of eye; the chin is bluish black in males. The call is a rather high pitched bleat that is from two to two and a half seconds in duration.

*Remarks.* This form may be separated from its congeners by the greater webbing on the feet and absence of a reticulated or ocellated pattern on venter. Specimens were obtained at night. Their call suggests the call of a small lamb or kid. Often they would call from the edges of pools where they had burrowed into the earth leaving only small openings to the outside.

*Hypopachus maculatus* sp. nov.

(Plate LXII, figs. E, F; Plate LXIII, figs. 2, 2a)

*Type.* EHT-HMS No. 1023; near San Ricardo, Chiapas, Mexico, September 2, 1935; E. H. Taylor and Hobart M. Smith colls.

*Paratypes.* EHT-HMS Nos. 1016-1022; Asunción, Chiapas, Mexico, September 1, 1935, Hobart M. Smith and E. H. Taylor.

*Diagnosis.* Related to *alboventer* but differs in having the sides and posterior part of body spotted with black; a fine median dorsal line; a diagonal cream line behind the eye; body more elongate in proportion to width; eye larger in proportion to length of snout.

Toes of males nearly one-third webbed; venter cream-white unspotted. Known maximum size, 41 mm. ♀.

*Description of the type.* Adult female; head width (11.6 mm.) greater than length, (9.2 mm.); very heavy fold across head behind eye, continued to arm; a groove crosses jaw angle and passes across the throat; eye length (4 mm.) greater than length of snout (2.9 mm.); width of an eyelid (2.2 mm.) slightly more than half the interorbital width (4.1 mm.); choanae very large, not more than half concealed by jaws when seen from below; tongue without pigment (true also of *alboventer*). Anterior dermal palatal ridge twice as long as its distance from the posterior; latter ridge followed by dermal plicae; which also reach forward on each side of the ridge; (vocal sacs in males).

Three palmar tubercles, the median largest extending forward beyond other two; subarticular tubercles large; no supernumerary tubercles. When leg is brought forward the inner metatarsal tubercle reaches anterior corner of eye.

Toes less than one-fifth webbed, the web continued on sides of toes as narrow dermal fringes (nearly one-third webbed in males); inner metatarsal tubercle with a compressed edge, the outline not semicircular, its greatest length a little longer than its distance to tip of inner toe; outer metatarsal tubercle about half size of inner.

Skin with small pustules, not strongly defined (more so in some paratypes); a few indistinct granules on posterior part of femurs; male with minute spinules on pustules, on toe edges and on chin.

*Color.* Above purplish brown with an irregular row of spots from eye along side to groin; some scattered darker areas on back, numerous spots on lumbar region and groin; a double, black line crosses femur and tibia; arm faun with some small black spots; dorsal part of femur faun; tibia lavender; posterior face of femur faun, heavily spotted with black; below uniform cream (males with black throat); lip light lavender; a cream line from eye to foreleg.

*Remarks.* The series of measurements given of the type series, show the variations in proportions; the photographs of the two paratypes give the variations in markings.

The specimens were collected while Doctor Smith and I were enroute to Tuxla Gutierrez, from Tonolá. About nightfall we arrived at a small stream near Asunción, and finding it flooded, we were forced to spend the night at that place. We utilized the delay to good advantage obtaining the types of this species and good series of several other species during the night.

Measurements of *Hypopachus maculatus* sp. nov.

Museum.....	EHT-HMS	EHT-HMS	EHT-HMS	EHT-HMS	EHT-HMS	EHT-HMS	EHT-HMS
Number.....	1023	1016	1021	1017	1019	1018	1022
Sex.....	♀	♂	♂	♂	♂	♂	♀
Snout to vent.....	41.0	37.2	35.5	35.0	34.2	34.0	29.0
Snout to occipital fold.....	6.1	6.0	5.9	5.5	5.3	5.1	4.6
Head width at groove across jaws.....	11.6	11.0	11.1	11.5	11.2	10.1	7.4
Eye length.....	4.0	3.8	3.7	3.5	3.35	3.5	3.2
Eye to tip of snout.....	3.5	3.6	3.7	3.6	3.6	3.6	3.3
Length of snout.....	2.9	3.0	3.0	2.3	2.3	2.9	2.3
Snout extends beyond mouth.....	1.3	1.9	1.8	1.3	1.3	1.4	1.5
Eye to nostril.....	2.1	2.0	2.0	2.0	2.1	2.0	1.7
Width of eyelid.....	2.2	2.0	2.0	1.75	1.8	1.9	1.7
Interorbital width.....	4.1	3.9	3.55	3.6	3.9	3.3	3.1
First finger.....	3.3	3.0	3.0	3.2	3.4	3.0	2.4
Second finger.....	4.2	3.3	3.8	3.8	4.1	3.6	3.0
Third finger.....	7.0	6.3	6.6	7.0	6.9	6.3	5.3
Fourth finger.....	3.9	3.6	3.0	3.2	4.0	3.7	2.9
Hand and longest finger.....	11.4	10.3	11.0	11.4	11.0	10.8	8.0
Arm.....	24.8	22.0	21.8	23.3	21.5	21.3	19.6
Leg.....	52.0	47.0	46.0	45.0	47.0	47.0	31.0
Foot.....	21.8	22.0	21.3	20.0	22.0	21.5	15.2
Femur.....	16.2	14.5	13.0	13.0	13.0	14.2	8.2
Tibia.....	14.2	12.0	12.0	13.1	13.1	12.0	8.1
Axilla to groin.....	19.0	20.0	18.2	19.0	17.2	17.8	15.0
Heels separated when folded.....	4.3	4.0	3.1	2.8	3.8	3.4	2.0

*Hypopachus caprimimus* sp. nov.

(Plate LXI; Plate LXIII, figs. 1, 1a)

*Type.* EHT-HMS 18149, Agua del Obispo, Guerrero, in pine forest; June 25, 1938. Taylor, coll.

*Paratypes.* EHT-HMS, Nos. 1024-1026, Balsas river at Mexcala; 1027, Garrapata; 1028, Organos; 1029-1030, Mazatlán, near Chilpancingo; 6556-6559, 18145-18148, 18150, 18159, Agua del Obispo, near Rincón; 18142-18144, near Palo Blanco; 18151-18153, Buena Vista; 18154, 18158, El Limoncito, near La Venta; all localities in the state of Guerrero. Taylor, coll.

*Diagnosis.* A large species, the known maximum size (♀) 51 mm. Related to *oxyrhinus*, but differs in a broader head; eye longer than the snout (equal or less in *oxyrhinus*); and a broad, dark purplish or

blackish stripe from snout to groin, continued on front of femur. It differs from other forms in having the tongue pigmented, often forming blackish areas or spots; toes one-fourth (or a little less) webbed; a dark inguinal spot; venter cream with a deep, black-brown reticulation.

*Description of the type.* Width of head (14 mm.) much greater than length (9.2 mm.); eye (4 mm.) longer than snout (2.5 mm.); width of an eyelid (2.4 mm.) less than half the interorbital distance (4.1 mm.); distance between eye and nostril (2 mm.) greater than distance between nostril and snout tip (1.2 mm.); a fold back of eyes crossing head and continuing back on side of neck to arm insertion; a fold passing across angle of jaw and throat; angle of mouth not extending back as far as eye; no trace of tympanum; tongue elongate thick anteriorly, thin behind, feebly nicked posteriorly, free for nearly half its length; pigment on tongue forming a large dim, median area, terminating in two spots posteriorly; choanae large, not more than half concealed by overhanging shelf from upper jaw; anterior palatal ridge distinct, slightly curved; posterior ridge higher, thicker, followed by plicate folds; openings of the vocal sacs very distinct; arms rather long, the wrist reaching beyond snout; first finger shorter than second; latter about equal to fourth; three palmar tubercles, the median rather small (in paratypes, larger than outer) and extending farther forward; edge of fingers with minute, pearly spinules (wanting in females); leg short, the heels separated (by 6 mm.) when limbs are folded at right angles to body, heel reaches to a point above arm, and the anterior edge of inner metatarsal tubercle reaches to nostril; toes about one-fourth webbed, the web continued somewhat as narrow dermal fringes; inner metatarsal tubercle very large, its length minutely less than that of first toe, its free outline forming a half circle; outer tubercle more than half the size of inner, both tubercles compressed and with a free edge; skin above minutely corrugated, without pustules or granules; very slight evidence of granulation on sides; a few flattened, indistinct tubercles below anus.

*Color.* Above lavender-brown, with an irregular series of streaks and small spots of black forming diagonal line which connects with a black inguinal spot; and which, when limb is folded, crosses femur, tibia and foot as a broad, blackish band with a light line or spots within its borders; a broad, black stripe from snout to groin and along front face of femur, the upper edge clearly defined by a lighter border; upper arm cream above, dark anteriorly and pos-

teriorly; forearm and hand spotted with purplish or black. Venter bright cream, with a heavy, dark reticulation. Palms and soles purplish, the tubercles cream; posterior face of femur black with some lighter spots.

*Measurements in mm. of type and large female (No. 18159).* Snout to vent, 42.5, 51; length of snout, 2.5, 3.4; eye, 4, 4.5; width of head, 14, 14.8, length of head, 9.2, 10.3; arm, 26, 30.5; leg, 51.8, 58.5; tibia, 16, 18; foot, 28, 29.5.

*Remarks.* The diagnostic characters given separate this species from other recognized species. The variation in shade of dorsal coloration is great, ranging from a clay color and light brown to purplish and from lavender to deep red. The call is a sustained bleat.

### *Microhyla elegans* (Boulenger)

*Engystoma elegans* Boulenger, Catalogue of the Batrachia Salientia s. Ecaudata in the collection of the British Museum, 2d Ed. 1882, p. 162 Type description; type locality "Cordoba," Veraacruz, Mexico.

*Gastrophryne elegans* Kellogg, Bull. U. S. Nat. Mus., No. 160, p. 183, 187.

*Microhyla elegans* Parker, A monograph of the frogs of the family Microhylidae, London, 1934, p. 126,144.

A single female specimen, EHT-HMS, No. 12692 ♀ was collected by Doctor Smith in Tres Brazos, Campeche, September 19, 1936. Its size suggests a young animal as its snout to vent measurement is only about one-half that of the largest known specimen.

Head rather pointed, strongly projecting (1.1 mm.) beyond mouth; eye (1.6 mm.) in length of snout (2.1 mm.) 1.3 times; eye to tip of snout, 2.5 mm. (in the type, the snout is twice the diameter of the eye); canthal region rounded, very slightly concave in front of eye; a strong skin fold across head behind the eyes, which passes down on side and is dimly traceable back toward the insertion of the front leg, and from eye back it is bordered by a groove; a groove crosses posterior part of jaws and is visible on sides of chin; nostril much nearer tip of snout than eye; width of an upper eyelid (1 mm.) in interorbital distance, 2.3 times. Tongue large, free behind for nearly half its length; anterior dermal ridge slightly curved, separated laterally from raised, rounded areas by a narrow distance; second ridge transverse, crenulate, behind which the derm is arranged in parallel longitudinal folds; openings of the Eustachian tubes opposite the raised rounded areas, small, about one-third the diameter of a choana; latter large, when observed from a ventral view, more than two-thirds of the opening is concealed by an overhanging shelf. (Males with a vocal sac.) Pupil of eye round.

Limbs well-developed, the arm reaches beyond the snout; the



hind leg brought forward along the sides of the body, the tibiotarsal articulation reaches eye, the metatarsal tubercle reaches the tip of snout; three flat, palmar tubercles on hand, the median extends farther forward than the other two; fourth finger a little longer than second, reaching the second outer subarticular tubercle; first finger short, reaching anterior edge of the subarticular tubercle of the second, tubercles only slightly raised. A slight, indistinct, inner metatarsal tubercle; first toe reaches posterior edge of tubercle on second toe; second toe reaches to anterior end of the proximal tubercle of third toe; third toe to the distal tubercle of fourth; fifth toe slender small, failing to reach the medial tubercle of fourth toe; apparently no trace of web (a rudiment in males); when limbs are bent at right angles to body, the heels touch.

*Color and markings.* Brownish lavender above; a stripe on side of snout, and from behind eye, continues dimly to groin; an inguinal black spot. A single, broad, black-edged stripe crosses femur, tibia and heel. A triangular dark spot involves anus; an hourglass-shaped dark spot begins near eyes and disappears near middle of back; chin with a fine distribution of pigment enclosing small irregular cream spots; belly cream or whitish, with a more or less regular reticulum of dark pigment; a few darker spots on knees; undersurface of hands and feet pigmented, including tubercles; a light spot on tip of snout.

*Measurements in mm.* Snout to vent, 18; to arm, 7; axilla to groin, 8.5; tip of snout to fold of head, 3.3; width of head to groove on jaw, 5.1; arm, 9.8; leg from anus, 26.5; femur, 8; tibia, 8; foot from heel, 13.

*Remarks.* This small species remains rare in collections. There are three, including the type from Veracruz in the British Museum, and a single specimen in the University of Michigan collected in Guatemala.

#### *Microhyla olivacea* (Hallowell)

*Engystoma olivaceum* Hallowell, Proc. Acad. Nat. Sci. Philadelphia, 1856 (1857), p. 252 (type description; type locality probably Kansas, although not specifically stated).

*Gastrophyrne olivacea* Smith, Copeia, 1933, No. 4, p. 217. (Kansas, Oklahoma.)

*Microhyla olivacea* Parker, Monograph of the Microhylidae, 1934, pp. 148, 201.

This species is represented in the collection by a considerable number of specimens as follows: EHT-HMS Nos. 1193-1196, two to three miles east of Torreón, Coah., Mex., August 29, 1932, E. H. Taylor-H. M. Smith colls.; Nos. 1226-1235, five miles north of Conejos, Durango, Mexico, June 25, 1934, H. M. Smith and David

Dunkle; No. 1197, Zapata, Texas, U. S. A., September 3, 1932, Taylor and Smith; Nos. 1198-1218, 13 mi. S. E. Rio Grande City, Texas (Arroyo El Salado), September 6, 1932, Taylor & Smith; Nos. 1219-1225, 3 mi. S. E. Rio Grande City, September 3, 1932, Arroyo Los Olmos, Taylor and Smith.

A few slight differences are in evidence between northern (Kansas) specimens and southern (Mexican) forms, but these differences seem to break down where large series are available. I can see no constant differences between Texas specimens and those from Coahuila and Durango.

*Description of species.* From EHT-HMS No. 1194, Torreón, Coah., adult female. Head triangular; general habitus very stout (female with eggs); eye small (2.4 mm.), shorter than snout (2.9 mm.); distance of eye from anterior tip of snout, 3.2 mm.; eye to nostril, 1.9 mm.; eyelid (1.3 mm.) contained in interorbital width (3 mm.) 2.3 times; snout to occipital fold 4.7 mm.; snout extends beyond mouth 1.5 mm.; snout rounded, the canthus not distinct; lores oblique with only a slightly concave region. The anterior dermal fold on palate shorter than posterior and separated by a distance about equal to the width of the anterior; openings of the eustachian tubes small, less than a fifth as large as the very large choanae; a line drawn between the openings of the eustachian tubes passes anterior to the anterior dermal fold; more than half of choanae visible when viewed directly from below; tongue large, rounded a little in front, flattened behind, free for a little less than half its length.

Skin smooth save for numerous tubercles on posterior face of femora on either side of anal region; a curving fold crosses the head and runs back to arm, the fold thickened laterally; a groove crossing the angle of the jaw can be traced a short distance on chin.

Arm brought forward the hand extends beyond snout; palmar tubercles large, flat; fourth finger longer than second; subarticular tubercles large rounded; leg brought forward, the inner metatarsal tubercle does not reach eye; when legs are folded at right angles the heels touch (or sometimes slightly overlap); inner metatarsal tubercle relatively small, its length contained about twice in its distance from the tip of the first toe; toes not or but slightly flattened, no lateral fringe or only a faint trace of a dermal fringe on toes; male with a vocal sac.

*Color.* Above olive-brown in alcohol, usually more olive in life; a few very small, darker, rounded spots on dorsal surface; the dor-

sal pattern, as such, is wanting; a few dark flecks arranged in an irregular row behind eye, and one between eyes; below immaculate; very slight pigmentation under chin, some on under side of the feet and hands, not visible save under a lens.

*Variation.* Males differ from females in having small pearl-colored tubercles scattered on the back, eyelid, dorsal surface of tibia-fibula, dorsal and posterior part of foot, on edges of fingers and a semi-circular patch around the edge of lower jaw; occasionally a few scattered ones back of the femur near anus—but never as numerous or as prominent here as in females.

In color the markings vary from nearly uniform olive specimens to specimens with still more numerous black spots than in the described specimens. The colors range from gray to brown. One or two specimens have a median dorsal dark pattern, bordered by the darker spots. Males have a dark infusion on the chin, due to the pigmentation of the vocal sac lining. In specimens of equal head-body length there is some variation in size of foot and also slight variation in the relative lengths of the fingers and toes. The largest male specimen (No. 1234) from Conejos, Durango, has somewhat more pigment on throat and breast and on the underside of hands and feet; the toes seem slightly flattened and there is a faint indication of a web. Since the lining of the mouth is somewhat loose the relation of the openings of the eustachian tubes and the dermal folds varies somewhat.

*Remarks.* These specimens extend the known range into the states of Coahuila and Durango, a distance of about three hundred miles.

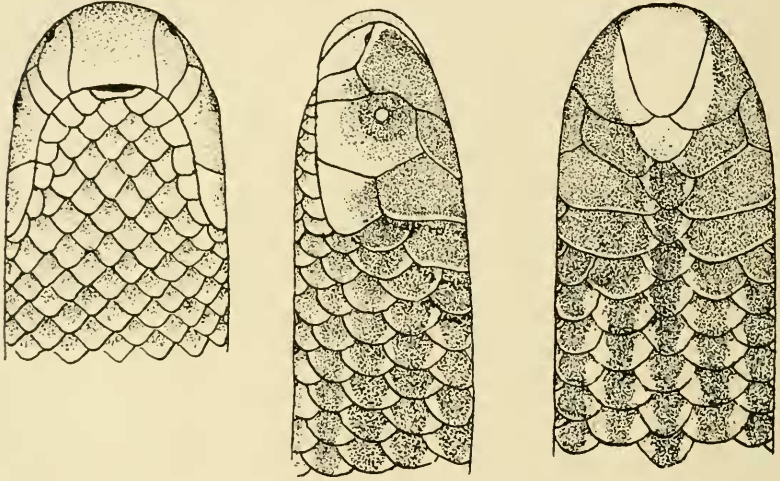
Aside from the specimens already listed I am associating with this species three specimens which may be specifically distinct from this form. I collected the specimens, Nos. 1236 ♀, 1238 ♀, and 1237 ♂, at Mazatlán, Sinaloa, July 20, 1934, at an elevation less than ten meters above sea level. The specimens are dark brown, with an irregular, more or less continuous dark line beginning a little behind eye and continuing along the side for some distance beyond arm. Anal region of female less papillate; eye a little smaller and snout narrower and extending a little more beyond the mouth than in equal-sized specimens from Durango and Texas.

The three specimens are small and indifferently preserved. I have hesitated to describe the form as new without a more adequate series of specimens. The largest specimen, a female, measures 25 mm. snout to vent, but is adult containing eggs; the largest male measures 23 mm.

*Leptotyphlops magnamaculata* sp. nov.

*Type.* U. S. N. M. No. 54760, Utilla Id., Honduras., F. J. Dyer, collector. (The specimen is a female containing two eggs.)

*Diagnosis.* A small, lined species (length, 167 mm.) with a large cream spot involving much of rostral, edges of nasals and the prefrontal. Rostral but little less than half width of head, supraoculars present, two labials; scales 14 rows; 233 dorsal scales; terminal scale wedge-shaped.



TEXT FIG. 1. *Leptotyphlops magnamaculata* sp. nov. Type. USNM, No. 54760; Utilla Island, Honduras. ( $\times 11$ .)

*Description of the type.* Rostral large, a little less than half width of snout, slightly narrowed between nostrils, extending back between eyes but not reaching their posterior level; nasals separated by the prefrontal, which is much smaller than the supraoculars; latter widely separated from first labial, reaching to very near edge of eye above; anterior parietal very broad, in contact with second (last) labial; posterior parietal (occipital) wide, slightly narrower than the preceding, separated from the second labial by a single scale; nasal completely divided, the superior nasal wider and longer than inferior nasal, considerably narrower than the rostral at its widest point; first labial small, not reaching as high as the inferior nasal, reaching as high as eye but not level of pupil; the labial border of first labial larger than that of inferior nasal; eye very large, raised slightly, pupil distinct; the labial border of ocular slightly less than second labial; ocular slightly narrower than the

rostral; four lower labials, last largest, completely concealed when jaw is closed; six scales, as well as the median mental, which is grooved but not divided, border upper labials when mouth is closed; scales from rostral to tail spine about 233; scales under tail, 17; head scales with minute rugosities; if epidermis is shed, these appear as pits on scales.

*Color.* Color above, deep, dark brown, forming continuous lines; below only slightly lighter brown, the edges of all scale rows lined with creamy white. The four dorsal light lines are widest and run from head to near tip of tail, each occupying space on edges of two scale rows; the line between the fifth and sixth rows is almost obsolete and the brown coloration here forms a band nearly two scales wide; the lines between the fifth and fourth and the fourth and third scale rows are more pronounced than the preceding and are somewhat zig-zag; lines between third and second, second and first are less contrasted. Head brown, with a prominent cream spot on snout covering rostral, prefrontal (internasal) and parts of the upper nasals. The lower part of ocular and the posterior upper labial have an irregular cream area. Ventral edges of the rostral, nasal and first labial, as well as the lower labials and chin are light with more or less pigmentation. Tip of tail including about four transverse scale rows, clear cream.

*Measurements.* Total length, 167 mm.; tail, 10.4 mm.; width of head, 2.5 mm.; width of body, 3.7 mm.; tail length in total length, 16.7 times; diameter of body in total length, about 45 times.

*Remarks.* This species, related to *phenops*, is differentiated by the size of the frontal cream spot and the lower number of ventrals; the body is apparently wider in proportion to length and the rostral is wider, and the terminal spine is somewhat vertically wedge-shaped.

I presume it is a derivative of *phenops* that has differentiated in an island habitat.

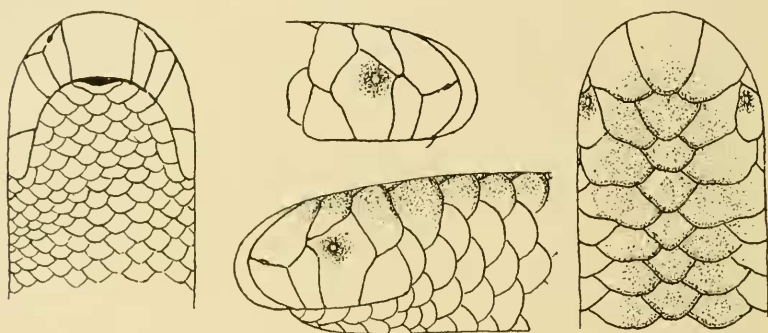
*Leptotyphlops rufidorsum* sp. nov.

*Type.* U. S. N. M. No. 49993, Lima, Peru. Townsend, collector.

*Diagnosis.* A large (265 mm.) species lacking white or yellow spots on snout and tip of tail, and lacking lineated dorsal markings. Supraocular very large, in contact with (or narrowly separated from) first labial. Two labials. Total dorsal scales, 268; 14 scale rows. Tail in body length, 22 times; body width in length about 61 times.

*Description of the type.* Rostral broad, (1.85 mm.) slightly less than one-half width of head (3.85 mm.), somewhat tongue-shaped,

the sides widening slightly near the tip of snout, then gradually narrowing to a blunt, rounding tip, behind, broadly in contact with the internasal (prefrontal) and separated from the supraoculars; prefrontal large, wider than long, smaller than the supraoculars; latter elongate, diagonal, in contact with the first labial at about level of eye pupil on right side (on left narrowly separated; [abnormally?]). Nasal completely divided, the widest point on the nasals about equal to greatest width of the ocular; latter irregular in shape, bordering the lip to a slightly lesser extent than the second (last) labial; anterior parietal larger than the posterior, broadly in contact with the second labial, from which the second



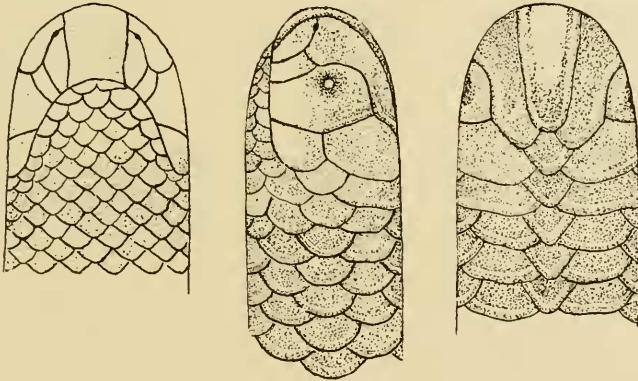
TEXT FIG. 2. *Leptotyphlops rufidorsum* sp. nov. Type.  
USNM, No. 49993; Lima, Peru. ( $\times 8$ .)

parietal is separated by a single scale; frontal smaller than either prefrontal or interparietal; median scales following the interparietal smaller than adjoining scales; four lower labials, the fourth largest and completely concealed; when mouth is closed, six scales appear to border the upper labials, the last three separated from the labial border by the fourth labial. Scales in fourteen rows anterior to anus; on tail ten rows. Anal large; first subcaudal much wider than succeeding scales. Total dorsal scales from rostral to tail spine, 268; subcaudals 17.

*Color in alcohol.* The three median dorsal scale rows and the adjoining half rows on each side reddish-brown with only slight indication of darker centers; remaining rows creamy white; the spine is distinctly darker than remainder of tail (perhaps nearly black in life).

*Measurements in mm.* Total length, 265; tail, 12; width of head, 3.85; width of body, 4.3.

*Remarks.* The relationship of this species with other South American forms is a bit uncertain. It is widely separated from *albifrons* by absence of lineated pattern, terminal yellow spots and about 78 more transverse scale rows; from *goudotii* in having the nasal completely divided; from *affinis* by having the first labial relatively narrow and in contact with the supraocular; from *bilineata*, *macrolepis*, *myopica* and *bressoni* by having only two labial scales; from *humilis*, *dugesii* and *septemstriata* in having supraoculars; from *bakewelli* and *phenops* in the type of color and markings and absence of contact between labial and supraocular; from *dimidiata* it differs in having a large supraocular touching the labial; the tail is contained in total length 22 instead of 14 times; from *maximus* and *dulcis* by the very large supraocular and higher number of scales; from *borrichiana* in having the supraocular touching the first labial.



TEXT FIG. 3. *Leptotyphlops nasalis* sp. nov. Type. USNM. No. 16134; Managua, Nicaragua. ( $\times 12$ ).

*Leptotyphlops nasalis* sp. nov.

*Type.* U. S. N. M. No. 16134, Managua, Nicaragua.

*Diagnosis.* A form lacking supraoculars, their space occupied by the superior nasal rather than by the oculars; no prefrontal; fourteen scale rows. Rostral elongate, reaching behind posterior level of the eye; two labials present; dorsal scales, 253; tail, in total length, 14.6 mm.; diameter of body in total length, 55 times.

*Description of the type.* Rostral but little more than one-third width of head, tongue-shaped, narrowed a little between the nostrils, extending back considerably behind posterior level of eye, in contact with the frontal; nasal divided completely, the superior nasal greatly

elongated, extending farther back than the rostral; superior nasal somewhat narrower than the rostral, slightly narrower than the ocular; anterior parietal very large, broadly in contact with the last (second) labial; second parietal (occipital) narrower, separated from the last labial by a single scale; only first pair touches the frontal, which is as large as the interparietal; prefrontal wanting; first labial narrow, reaching to lower level of eye but not as high as the pupil, separated from the second labial by the ocular. The labial border of the inferior nasal less than that of the first labial; labial border of ocular much larger than that of preceding scales but less than that of the second labial; four lower labials, the outer largest, concealed (when mouth is closed, six scales border the upper lips); eye distinct, rather large, more than half the width of an ocular; eye and pupil distinct; about 253 scales from rostral to terminal caudal spine; 21 scales under tail; 14 scales around body; 10 scales around tail.

*Measurements.* Snout to vent, 110 mm.; tail, 7.5 mm.; diameter of body, 2 mm.; tail in total length, 14.6 mm.; diameter in length, 55 times.

*Color in alcohol.* Above light brown, the color lighter on the ventral surface (may be discolored somewhat by preservation); a small cream spot on rostral beginning near anterior end of snout, but not reaching anterior level of eye. On the tail the spine alone is cream.

In the dorsal coloration there is some slight segregation of the pigment but trace of the lineation such as is present in *bakewelli* or *phenops* is wanting.

*Remarks.* The curious elongation of the nasals, the absence of supraoculars and a prefrontal, easily distinguish this species from any of the other known species.

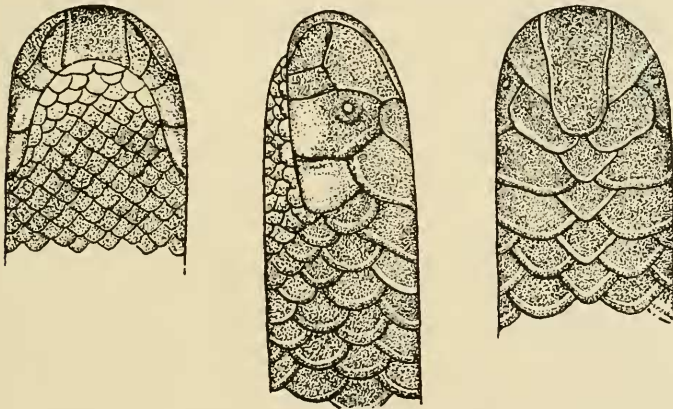
*Leptotyphlops ater* sp. nov.

*Type.* U. S. N. M. No. 79957, Managua, Nicaragua, H. C. Kellers, collector.

*Diagnosis.* A medium-sized, heavily pigmented species, showing no trace of dorsal lineation; large supraoculars present, widely separated from the labial, broadly in contact with the rostral; two labials; eye moderately distinct, rostral lacking trace of terminal cream spot; terminal spine cream; fourteen scale rows; tail in total length, about 18.9 times; width of body in total length, about 60 times; 259 scales snout to vent.



*Description of the type.* Snout rather truncate anteriorly; rostral somewhat less than one-half width of head at widest point, the part above rather tongue-shaped, extending distinctly behind the posterior level of the eye, broadly in contact with the supraoculars; prefrontal absent; frontal small, equal to interparietal, a little more than half the size of the supraoculars; anterior parietal large, wider than posterior parietals, broadly in contact with the last (second) labial; the posterior parietal separated from labial by a single scale; nasal completely divided, the lower part small, much narrower than upper part; first labial barely reaching lower level of the eye which is moderately distinct; part of rostral on under side of snout slightly



TEXT FIG. 4. *Leptotyphlops ater* sp. nov. Type. USNM, No. 79947; Managua, Nicaragua. ( $\times 9$ ).

narrower near the nostrils; the labial border of the ocular a little larger than that of last labial; the labial border of first labial small, about equal to that of the inferior nasal; three lower labials on right, four on left side; six scales border the upper labials when the mouth is closed.

All the head scales have tiny rugosities which appear as pits when epidermis is removed; scales in 14 rows to anus; 10 about tail; 259 dorsal scales between rostral and terminal spine; anal large, single; 17 subcaudals, the three rows under tail much widened; eye large, moderately distinct.

*Color in alcohol.* Blackish-brown to blackish above; ventral surfaces a lighter brown, the terminal spine cream; scales bordering mouth whitish, showing some unpigmented areas.

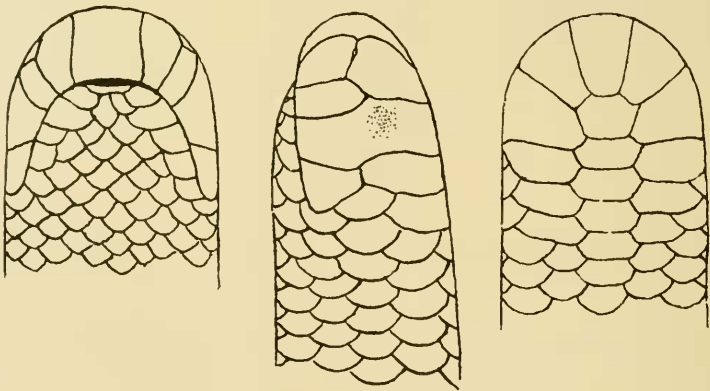
*Measurements.* Total length, 185 mm.; tail, 9.8 mm.; width of body, 305 mm.; width of head, 2 mm.

*Remarks.* This species is possible related to *bakewelli*, despite the fact that it lacks a rostral cream spot and lineated markings on body. The relation of the frontal and the supraoculars are similar in the two species; the other Central American species having an elongate rostral (*Leptotyphlops nasalis*) lacks the supraoculars and the space occupied by the supraoculars is occupied by the superior nasals. This species lacks the lineated markings.

*Leptotyphlops dugesii* (Bocourt)

*Siagonodon dugesii* Bocourt, Etude sur les reptiles, Mission Scientifique au Mexique et dans l'Amérique Central, Livr. 8, 1882, pp. 507, 508, pl. XXIX, fig. 9, 9a, 9b, 9c; and pl. XXX, fig. 4 (type description; type locality, Colima, Mexico, A. Dugès collector).

This species has remained very rare in collections. Three specimens in the U. S. National Museum belong to this form: No. 26140 "Mexico," A. Dugès; No. 48537, Guanajuato, A. Dugès; No. 49632 Talpa, Jalisco, Nelson and Goldman. The last specimen has been badly dried and broken. The others are in a fair state of preservation, save that they are badly faded.



TEXT FIG. 5. *Leptotyphlops dugesii* Bocourt. USNM, No. 26140; "Mexico." ( $\times 7$ ).

The relationship of this form is probably with *Leptotyphlops humilis* (Baird and Girard), but I am not prepared to admit that the relation is subspecific. The total count of scales from rostral to terminal plate is 231 and 244 in the specimens mentioned above; there are 18 scales under the tail. In both cases the anal is entire (divided in one of the two cotypes). The head is more truncate than in *humilis* and the median scales following the rostral have straight transverse edges. The prefrontal is much larger in *dugesii*.

The coloration of the U. S. N. M. specimen is badly faded. Bo-court says of the types, "Une teint d'un jaune roussâtre, légèrement carminé, est répandue sur toutes les régions supérieures du corps. Les parties inférieures sont d'un jaune rosé."

Characters of the scales are indicated in the figure.

## SYNOPSIS OF AMERICAN LEPTOTYPHLOPIDAE

1. Snout with a sharp transverse edge. . . . . 2  
Snout rounded in profile, no sharp transverse edge. . . . . 3
2. Snout hooked; supraoculars present; total length, 180 mm.; tail in total length, about 26 times; diameter of body in total length, 50 times; pale brown above, white below. Type locality, Cruz de Eje, Argentina. . . . . *unguistrostris* (Boulenger),  
Snout not hooked; supraoculars absent; total length, 185 mm.; tail in total length, 28; diameter of body in total length, 61; 5 dorsal scale rows light brown, borders lighter; white ventrally and laterally. T. 1., Santa Rosa, Mendoza, Argentina, *borrichiana* (Degerbol),
3. Four upper labials; ocular not bordering mouth; 110 mm.; tail in total length, 14 times; body diameter in total length, 36 times; yellowish, each dorsal scale with a large, reddish-brown spot; yellowish dorsolateral line. T. 1., Martinique, Lesser Antilles . . . . . *bilineata* (Schlegel),  
Less than four upper labials. . . . . 4
4. Three upper labials; supraoculars present. . . . . 5  
Two upper labials. . . . . 7
5. Anterior parietal touches third (last) labial. . . . . 6  
Anterior parietal separated from third labial by a postocular scale; 240 dorsal scales; 265 mm.; tail in total length, 19.6 times; diameter in total length 53; purplish on 7 dorsal rows; dirty white below, with a lavender spot on each scale. T. 1., El Sabino, Uruapan, Michoacán, Mexico. . . . . *bressoni* Taylor,
6. Second labial reaches level of eye; 208 mm.; tail length in total length, (16)-20; diameter of body in total length, 39-50; dorsal scales, 233-246; 7 dorsal scale rows brownish or faun; below white. T. 1., Tampico, Mexico. Range, northern Mexico, Arizona to Kansas. . . . . *myopica* (Garman),  
Second labial does not reach eye; 290 mm.; tail in total length, 14-15; diameter in total length, 41; dark brown above, each scale with a lighter border; lighter beneath. T. 1., "Caracas; Puerto Cabello." Range, Venezuela, *macrolepis* (Peters),
7. Supraoculars absent . . . . . 8  
Supraoculars present . . . . . 13
8. Nasal not reaching posterior level of eye. . . . . 9  
Nasals elongate, reaching back beyond posterior level of eye; cream spot on rostral; rostral reaches to behind eyes; total dorsal scales, 253; total length, 110 mm.; tail in total length, 146; diameter in total length, 55. T. 1., Managua, Nicaragua, *nasalis* sp. nov. 535
9. Seven dark or black dorsal lines on a yellowish ground; no terminal spine; 220 body scales; about 10 on tail; 280 mm.; tail in total length, 28; diameter in length, 45. Known from Rio Negro, Amazonas, Brazil. . . . . *septem-striata* (Schlegel),  
No dorsal lines . . . . . 10
10. Average dorsal scale count above 260. . . . . 11  
Average dorsal scale count less than 260. . . . . 12
11. Seven dorsal scale rows dark brown; lighter below; dorsal scales 263-281, average, 273; maximum length, 245 mm.; diameter in total length, 47-61; average 53. T. 1., Valliecityas, California. . . . . *humilis humilis* (Baird and Girard),  
Very light brown; dorsal scales, 279-301; average, 289; diameter in total length, 49-61; average, 54; length, 337 mm. T. 1., Yaqui Well, San Diego county, California. Range, California and Arizona. . . . . *humilis cahuilae* Klauber,

12. Light brown on 5 scale rows; 244-263 dorsal scales, average 252; diameter in total length, 42-54; average, 46; length, about 300 mm. T. 1., La Paz, Baja California. Range, Cape region, Baja California.....*humilis stevini* Klauber, Above reddish-yellow; below yellow rose; scales 231-244; under tail, 18; total length, 229 mm.; tail in length, 23; diameter in length, about 52. T. 1., Colima, Mexico, *dugesii* (Bocourt), 538
13. Supraoculars very large, touching or narrowly separated from first labial..... 14  
Supraoculars small, widely separated from first labial..... 15
14. Three dorsal scale rows and adjoining half rows chestnut brown, without trace of lines; no spot on snout or tail; white below and laterally; 265 mm.; dorsal scales 268; tail in total length, 22; diameter of body in total length, 61. T. 1., Lima, Peru .....*rufidorsum* sp. nov., 533  
Dorsally brown, with distinct light lines bordering edges of scale rows; venter light brown, lighter anteriorly than posteriorly; a cream spot on snout and on tip of tail; 175 mm.; total dorsal scales 218-229; tail in total length, 13-17; diameter of body in length, 39-47. T. 1., Kartabo, British Guiana.....*tenella* Klauber,
15. Body greatly attenuated; dorsal scales above 300; dim lighter lines present on dark-brown color of dorsum; lighter brown below; 188 mm.; tail in body length, 17; diameter of body in total length, 82; scales, 331. T. 1., Gran Tombes, northern Peru .....*subcerotilla* Klauber,  
Body not greatly attenuated..... 16
16. First labial very large, its labial border greater than that of ocular; 205 mm.; tail in length, 13; diameter in length, 51; brown above, each scale darker in center; whitish below. T. 1., Tachira, Venezuela.....*affinis* (Boulenger),  
First labial small, its labial border much less than that of ocular..... 17
17. Nasal on y partially divided\*; eye large; 15 scale rows on body, 14 on tail; 145 mm.; tail in total length, 25; diameter in length, 60; blackish, each scale edged with a wide grayish border. T. 1., Magdalena Valley, Columbia,  
*goudoti* (Duméril and Bibron),  
Nasal completely divided..... 18
18. Tail with more than 20 subcaudals; no white lines; no spot on snout or tail; 9 dorsal rows nearly black; ventral color somewhat lighter; 183 mm.; tail in total length, 11.8-14.1; diameter in total length, 54-59; dorsal scales, 255-263. T. 1., Watling Island, Bahama Islands.....*columbi* Klauber,  
Tail with less than 20 subcaudal scales..... 19
19. Rostral reaching behind the posterior level of eye; prefrontal absent; supraoculars rather large ..... 20  
Rostral not reaching level of eye; prefrontal present..... 21
20. Seven dark-brown stripes on seven dorsal scale rows separated by narrow lighter lines; below whitish; cream spot on rostral and under tail; scales 240-255. T. 1., Paso del Rio, Colima. Range, Colima to Guerrero, Tehuántepec (and south ?),  
*bakewelli* Oliver,  
Uniform plumbeous to black above, a little less dark below; no cream spot on rostral; 185 mm.; tail in length, 19; diameter in length, 60; dorsal scales 259. T. 1., Managua, Nicaragua .....*ater* sp. nov., 536
21. Body striped above with seven dark dorsal stripes; supraoculars larger than prefrontal ..... 22  
Body lacking stripes; prefrontal present; supraoculars not larger than prefrontal, 23
22. Rostral wide, the cream spot large, extending on adjoining scales; only spine on tail cream; 167 mm.; scales, 233; tail in length, 14; diameter in length, 45. T. 1., Utila Island, Honduras.....*magnamaculata* sp. nov., 532  
Rostral cream spot small; elongate spot under tail large, involving tip; scales, 242-256; average, 247; length, 135 mm.; tail in length, 16; diameter in length, 45. T. 1., Tehuántepec.....*phenops* (Cope),
23. A quadrangular spot on snout; scales bordered with whitish; reddish-brown above; pale below; without distinct lines; spot on tip of tail; 180 mm.; tail in total length, 19; dorsal scales ? T. 1., Environs of Para, Brazil....*albifrons* (Wagler),  
No quadrangular spot on snout..... 24

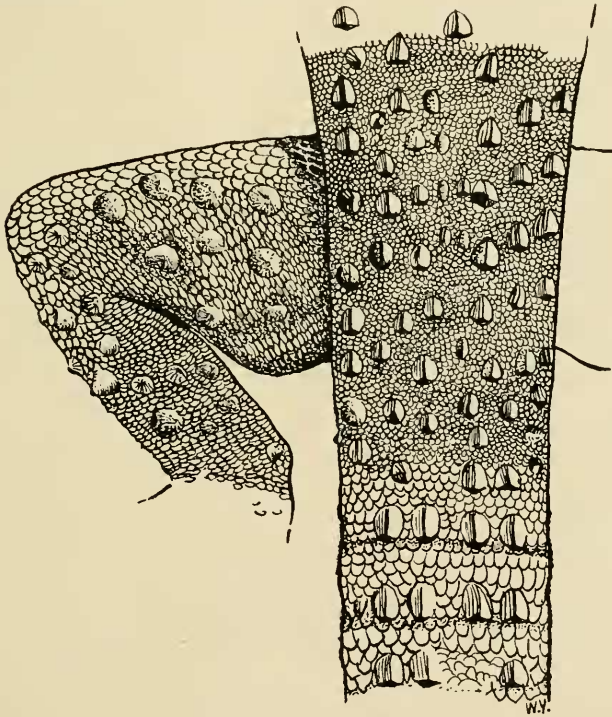
\* Boulenger, Cat. Snakes Brit. Mus., vol. 1, 1893, p. 64, states "nasal semidivided; scales in 14 rows."

24. Supraocular smaller than prefrontal, which is longer than wide; rostral reaches level of eye; pale reddish-brown above, scales edged with white; 280 mm.; tail in length, 14; diameter in length, 47. Brazil.....*dimidiata* (Jan),  
Supraocular usually larger than prefrontal..... 25
25. Nearly uniform brown above; no spot on rostral or tail; below white; 226 mm.; tail in length, 17.4-22.4; dorsal scales, 231-252. T. 1., between San Pedro and Comanche Springs, Texas .....*dulcis* (Baird and Girard),  
Uniform plumbeous above, with white tail tip; below white; 300 mm.; tail in total length, 18-25; diameter in total length, 37-43; dorsal scales, 220-221. T. 1., Chilpancingo, Guerrero, Mexico.....*maxima* Loveridge,

*Phyllodactylus lanei* Smith

*Phyllodactylus lanei* Smith, Univ. Kansas, Sci. Bull., XXII, No. 6, April 15, 1935, text fig. 13; Plate XXV, fig. 3, (type description; type locality, near Tierra Colorado, Guerrero Mexico).

*Phyllodactylus tuberculatus* Mosauer, Copeia No. 3, November 15, 1936, pp. 144-146 (part.).



TEXT FIG. 6. *Phyllodactylus lanei* Smith. Showing arrangement of tubercles (granular scales on body are depicted too small). (Much enlarged.)

Certain specimens in the collection referred to *P. lanei* by Smith proved to belong to a different species. Smith (*loc. cit.* p. 128) notes the difference in these specimens from typical *lanei*. The specimens in question are 1181-1183 Organos, Guerrero; 1499-1501

from Agua del Obispo, Guerrero, and 534, 535 and 741 from Mazatlán, Sinaloa.

Smith obtained a series from Hda. El Sabino, Uruapan, Michoacán, which I refer to *P. lanei* (EHT-HMS Nos. 10877, 10943-10994). This lot is especially uniform as regards significant characters. Each of the paired chinshields is in contact with two labials (in 99 out of 102 times). Counts on the number of scales between the middle of the orbits (not at narrowest point between orbits as counted by Smith) showing the following: The number 12 occurs in three specimens; 13 in thirteen specimens; 14 in twenty-three specimens; 15 in fourteen specimens; and 16 in three. Between the orbital edge and edge of eyelid there are usually three rows of granules and the palpebral row bordering the edge. In about 62 percent of the specimens there is an enlarged scute directly above the orbit. In other specimens the scale may be present on one side only or absent on both sides.

I obtained a series of this form in Guerrero in 1936 at the following localities: 11034, 11010, 11014, El Treinte; 10998, 10999, 11001-11006 near Palo Blanco; 11068 Tierra Colorado; 11012-11013 Puerto Crucita, north of Acapulco; in 1938, Nos. 16315-16316, Píe de la Cuesta, and 16317 near Xaltinanguis. These specimens do not show any appreciable departure from limits described by Smith for the species, when the specimens mentioned above are excluded.

### *Phyllodactylus delcampi* Mosauer

*Phyllodactylus delcampi* Mosauer, Copeia, No. 3, November 15, 1936, pp. 141-144, figs. 1-6 (type locality, Tierra Colorado, Guerrero).

This species may be easily differentiated by the absence of enlarged tubercles on the tail and on the dorsal and posterior surface of the femur; by the large size, with very small dorsal tubercles; and by the transverse dark or black bands on the body. The upper eyelid is apparently more ample than in the other known Mexican species of *Phyllodactylus*, and the pigmentation of the venter is usually somewhat more dense.

Six specimens (EHT-HMS, Nos. 18956-18961) were obtained at the type locality in 1938. Five of these were collected at night and are very much lighter than the types. One, No. 18959, preserved in the daytime is equally as dark as the type. The number of scales between middle of orbits (not counting eyelid scales) is 20-24. Five scale rows form a whorl on tail, the posterior series a little larger usually than the other four. In two cases the postmentals are separated by the mental, in four they are together. In four cases eight

scales follow the postmental, in two five. In two cases the postmentals each touch one labial; in two cases they touch two; in two, on one side, they touch one, while on the other they touch two. Usually there are twelve to fifteen scale rows between the ventral scales and outer row of tubercles. Anteriorly on the body the tubercles are in seven rows on each side, while posteriorly there are five rows on each side.

I have examined the types.

*Phyllodactylus homolepidurus* Smith

*Phyllodactylus homolepidurus* Smith, Univ. Kansas Sci. Bull., XXII, No. 6, April 15, 1935, text fig. 1 A and plate XXV, fig. 2 (type description; type locality five miles southwest of Hermosillo, Sonora).

No new specimens of this species have been collected. This form may be distinguished from the southern *P. lanei* by the very small pair of slightly enlarged scales on each tail segment, often so small as to be indistinguishable (as is true in the type); in the large number of scales between orbits (counted between the middle of orbit rather than the narrowest point); in the fact that chinshields usually touch only one labial; in the lack of the enlarged scales on orbital border; in the greatly reduced number and size of enlarged tubercles on dorsal part of the femur or their total absence.

The number of scales between the orbits varies between 19-24, the numbers 20, 21, 22 being equally common, the other counts are represented by one or two examples each; the tubercles on the dorsal part of the body are smaller and less salient than in *P. lanei*, and it is a somewhat smaller species.

From *muralis* it differs in coloration and markings; in having smaller, less conspicuous tubercles on the back; in the greatly reduced number or absence of small tubercles on the dorsal side of the femur. The tail is never so plump, and the scales do not form such distinct regular rows on the tail segments. It is a somewhat larger species.

*Phyllodactylus muralis* sp. nov.

*Type.* EHT-HMS No. 10902, near Totolapam, Oaxaca, August 7, 1935; H. M. Smith.

*Paratypes.* EHT-HMS Nos. 10883-10901, 10993-10939, August 6-7, 1935, Totolapam, Oaxaca, H. M. Smith collector; 11046, San Gerónimo, Oaxaca, August 22, 1935, E. H. Taylor.

*Diagnosis.* A rather small species, the postmental normally in contact with the first lower labial only; the scales following the postmentals slightly enlarged, irregular; the flattened scales of the

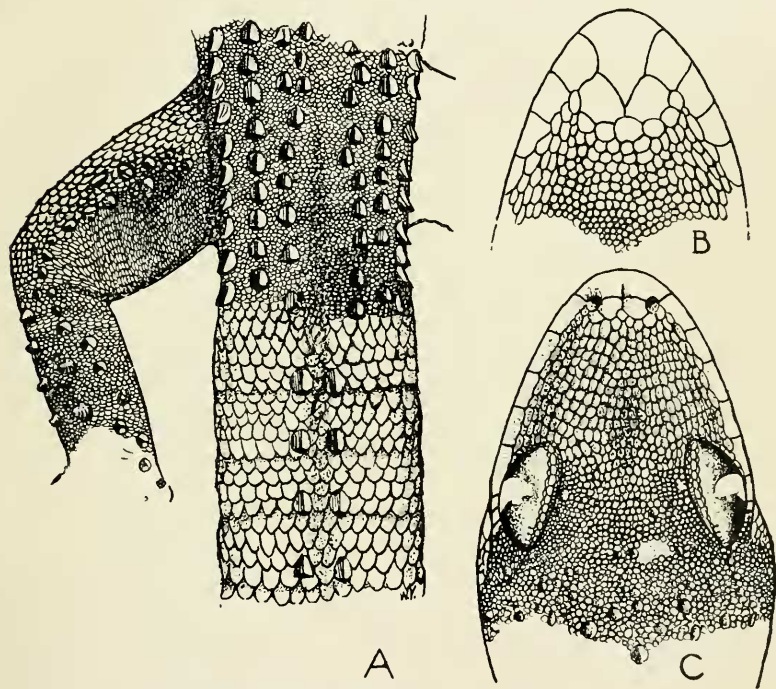
ventral part of the thigh reach the dorsal surface of thigh where there is usually a row of somewhat enlarged, rather inconspicuous, trihedral scales bordering them; posterior and posterodorsal surface of thigh without enlarged tubereles; dorsal surface of forearm covered with small scales intermixed with numerous, large, trihedral tubereles; 14 rows of large dorsal tubereles, outer rows short; 20-26 scales, average about 24, between middle of eyes (not counting scales on eyelids); 26-33 (average 31) scales in a row across snout between the middle of third labials; enlarged scales on snout extending slightly back of the anterior level of the eyes; very small, rounded or conical tubereles intermingled with small tubercular scales of the occiput; three or four large, closely juxtaposed postanal tubereles; tail slightly constricted at base, covered with transverse rows of small scales, rounded behind; annulations on tail distinctly marked, each annulus consisting of four or five scale rows, the posterior row with two enlarged, median, trihedral tubereles; maximum snout-to-vent length about 60 millimeters.

*Description of type.* Head moderately flat, somewhat wedge-shaped viewed laterally; a slight constriction in outline of head, as seen from above, just below orbits; a slight frontonasal depression; lores somewhat concave; interorbital scales about 26 between middle of eyes, 14 between anterior corners of orbits (in neither case counting scales on eyelids of which there are three small rows and the larger, irregular, palpebrals which become spinose posteriorly); about twelve scales in loreal region between orbital depression and nostril; scales bordering labials flat, imbricating; about 28 scales across snout between the third labials; rostral twice as wide as high, with a short, median, posterior groove or suture, bordered by a pair of supranasals, the nostril and first labial posteriorly; nostril bordered by rostral, first labial, internasal and two small postnasal scales; five upper labials to a point below middle of eye, diminishing in size posteriorly; here the mouth curves upward and there follow three or four small labial scales, only slightly larger than the surrounding scales; upper labial scales folded around the upper jaw, forming a somewhat flattened platform around edge of snout seen from above; five lower labials to a point slightly beyond middle of eye, anterior three very large, as wide as long, diminishing in size posteriorly; greatest width of mental only a little less than its greatest length, its labial border greater than that of rostral; a pair of large postmental scales, each touching the first labial only; a single enlarged medial scale about one-third size of the postmental follows with three or four other scales likewise



bordering the postmentals, scarcely larger than those of the adjoining row, which is scarcely distinguishable from the rows of scales on throat; scale rows bordering posterior part of jaw larger than scales in middle of chin between them.

A few small, scattered tubercles begin on head between posterior part of eyes and become somewhat larger on occiput; a few or no tubercles in area between lower half of ear and eye; ear opening diagonally placed, its distance from closest point of eye equals



TEXT FIG. 7. *Phyllodactylus muralis* sp. nov. Type. EHT-HMS, No. 10902; Totolapam, Oaxaca, Mexico. (Much enlarged.)

distance from eye to nostril; fourteen rows of trihedral tubercles on body, the two median rows and adjoining rows smallest, the median tubercles separated by about 5 granules anteriorly and by 8 or 10 granules on base of tail; tubercles on sides higher, and wider in proportion to length, than those of the median rows; upper arm with rather large, flat, imbricating scales on upper and anterior face while those behind and below are granular; forearm granular, with enlarged tubercles on upper and posterior sides, while below and on

anterior face the scales are flat, imbricating. Scales on ventral surface of leg large, cycloid, imbricated, covering anterior surface of thigh to its highest dorsal point where the scales are bordered by an irregular row of small trihedral tubercles; posterior face of femur and postero-ventral surface finely granular; upper surface of lower part of leg granular, with enlarged trihedral tubercles; on lower surface scales large, cycloid, imbricating; a ventrolateral fold more or less evident; 30 rows of flat, imbricating scales across abdomen; cloacal lip behind anus barely visible, not forming a posterior scale-like expansion; openings of cloacal pores prominent; 3, 4 prominent tubercles at sides of base of tail; cloacal bone strongly curved as shown in Smith (1935, text fig. B.); the upper tip is more pointed and the posterior part less widened and more rounded; scales under tail irregular, some widened, all much larger than on dorsal surface.

Terminal ventral lamella under fingers and toes longer than wide; the under surface of digits with broad transverse lamella-like scales, the distal one divided, occasionally the two distal; 7, 8, 11, 11, 8 is the lamellar formula for hand (not counting large terminal lamellae); for foot, 7, 10, 12, 11, 12.

*Coloration.* The specimen is nearly uniform gray without spots or color pattern in evidence; lighter, dirty whitish below.

Measurements (in mm.) and scale data on *Phyllodactylus muralis* sp. nov.

Number..	10910	10926	10899	10922	10902
Sex .....	♀	♀	♀	♀	♂
Snout to vent.	40.6	40.3	58.0	56.0	55.2
Snout to orbit	6.7	6.5	6.5	6.2	6.0
Snout to ear.	15.4	15.3	15.0	14.2	13.4
Snout to arm.	22.9	22.5	22.0	22.0	21.0
Axilla to groin.	29.0	29.1	28.0	26.3	28.0
Interorbital width	5.0	5.5	5.2	5.0	4.6
Head length	19.0	18.0	17.0	16.0	16.6
Head width	12.0	12.2	11.0	11.0	11.0
Arm	21.0	20.0	19.2	19.2	18.0
Leg..	26.9	24.1	22.4	22.0	22.2
Dorsal rows of tubercles..	6.7	7.8	7.7	7.7	7.7
Scales between middle of orbital edges	23.0	25.0	26.0	22.0	25.0
Enlarged cycloid scales across abdomen, max.	28.0	31.0	27.0	26.0	30.0
Scales between fourth labials across snout	21.0	31.0	33.0	27.0	28.0
Scales from orbit to nostril	13.0	12-14	13.0	14.0	16.0

*Variation.* The normal expectation is for each chinshield to touch one labial only (90 times, one, 23 times, two). Frequently the contact with two labials occurs on one side only. The scales bordering the chinshields are not greatly enlarged; however, there is a single median scale or a pair of median scales that are larger than the rest. The total number varies between six and nine, six occurring three times; seven, seventeen times; eight, thirty-two times; and nine, seven times. The occipital region is covered with granules similar to those on the back, with larger, rounded scales intermingled with them. The tail is constricted, rather distinctly at the base, more so in females than in males. The scales on the dorsal part of the upper arm are cycloid, imbricating, though somewhat thickened, in females; in males the scales are more or less trihedral and raised. The tubercles are very slightly larger in males. A few specimens show dorsal spots arranged in indefinite rows. A more or less definite line extends from the snout to the forearm along the side of the head. The tails are broken in every specimen, suggesting that this member is extremely fragile. The tails at the base are somewhat brownish with indefinite darker spots. In some specimens the pairs of enlarged scales on the tail are less strongly differentiated from the other scales of the tail than in the type.

*Remarks.* Most of the specimens were taken on walls at twilight and after dark. The specimens of the species are very numerous at Totolapam.

In the reduction of the enlarged scales on the tail and the posterior part of the femur this form approaches *homolepidurus* more than it does *lanei*.

*Phyllodactylus magnatuberculatus* sp. nov.

*Type.* EHT-HMS No. 10995, Acapulco, Guerrero, Mexico, October 10, 1936, H. M. Smith.

*Diagnosis.* Characterized by very large heavy tubercles on dorsal surface in 14 rows, the outer rows smaller; scales between middle of orbits 17; scales of occiput as large generally as those between eyes with slightly larger scales intermingled on the temporal and occipital regions bordering the keeled or trihedral tubercles, all smaller than those on back. Those on nuchal region larger, but likewise smaller than those on back; larger trihedral scales on dorsal surface of femur intermixed with small, unequal-sized granules, the imbricate scales confined to anterior faces of femur; dorsal surface of upper arm with heavy trihedral tubercles placed closely together;

a pair of chinshields broadly in contact with two labials, and in turn bordered behind by four scales, the two median largest forming transverse sutures with the paired chinshields; base of tail with six heavy tubercles on first annules. Scales bordering anterior part of ear cavity, large, triangular, pointed.

*Description of the type.* Head moderately deep, its greatest length (20 mm.) is 1.5 times the greatest width (13.3 mm.); snout from orbit, 8 mm.; ten large scales between orbit and nostril; twenty-five scales across snout between the fourth labials; scales on snout rather large anteriorly, rounded, low, while in front of orbits, bordering a median elongate depression the scales are compressed conical, or somewhat trihedral; rostral nearly twice as wide as high; a single pair of internasals their suture with rostral, anterior to level of nostrils; nostril surrounded by rostral, first labial, an internasal and two postnasals, the upper largest; eyelid covered with three rows of granular scales and an outer row of superciliaries, anteriorly enlarged, flat, quadrangular, posteriorly strongly spinose; about seven enlarged upper labials, posterior small the suture between the sixth and seventh directly below the vertical pupil; five lower labials to the middle of eye followed by about three slightly enlarged scales; a few enlarged tubercles border the minute labials near angle of mouth. Mental elongate its labial width a little more than four-fifths of its length (3.5 x 4.15 mm.); chinshields in contact for about one-third their length; scales following chinshields are symmetrical forming straight transverse sutures with chinshields, each separated from labial by one scale.

A lateral fold present which is thickened with fatty tissue; granules on back between tubercles much smaller than (one-third) size of scales on occiput; scales on anterior surface of upper arm enlarged and thickened, gradually becoming trihedral or pyramidal on the dorsal surface, with a few small granules between them; forearm granular dorsally with trihedral or pyramidal tubercles; scales on anterior surface of arm larger, imbricating, on ventral surface small granular; scales on ventral surface of abdomen, cycloid, juxtaposed, showing some denticulation on posterior edges; ventral and anterior face of leg with cycloid, imbricating scales; dorsal and posterior face with granular scales; dorsal surface of femur with about 12 large conical or trihedral tubercles; femur and foot (to a lesser extent) with strong trihedral tubercles; terminal lamellae of digits widened and elongated the outer anterior edges angular rather than rounded; a pair of scales at base of the widened terminal

lamellae; under toes and fingers the lamellae may be single or paired, sometimes divided in three; claws retractile in a sheath above terminal lamellae; reproduced tail broken, but the basal segment has three heavy tubercles on each side of the first annulus.

*Color in alcohol.* Above yellowish-gray with a scattering of pigment; a few elongate dim spots visible along the back near median line; below immaculate yellow (under strong lens some pigment can be discerned).

*Measurements in mm.* Snout to vent, 66; snout to ear, 17.3; snout to arm, 26.5; axilla to groin, 30; arm, 20; leg, 24; head length, 20; head width, 13.3.

*Relationship.* The closest relationship appears to be with *Phyllodactylus lanei* from which it differs chiefly in the larger tuberculation of the back, the heavier tubercles of the upper arm, proportionally thicker head and the yellow coloration.

## PLATE LIII

FIG. 1. *Bufo mazatlanensis* sp. nov. Type. EHT-HMS, No. 374; Mazatlán, Sinaloa. Enlarged.

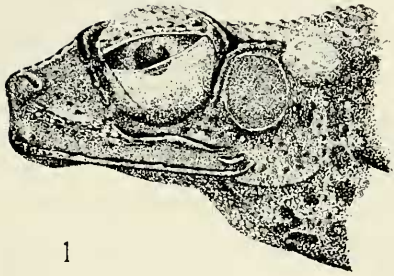
FIG. 2. *Bufo valliceps* Wiegmann. EHT-HMS, No. 596; La Clementina, Tamaulipas. Enlarged.

FIG. 3. *Bufo gummifer* sp. nov. Type. EHT-HMS, No. 18509; La Venta Guerrero.

FIG. 3a. Same. Ventral view of hand. Enlarged.

FIG. 3b. Same. Ventral view of foot. Enlarged.

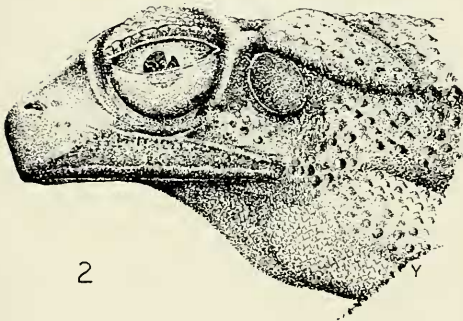
PLATE LIII



1



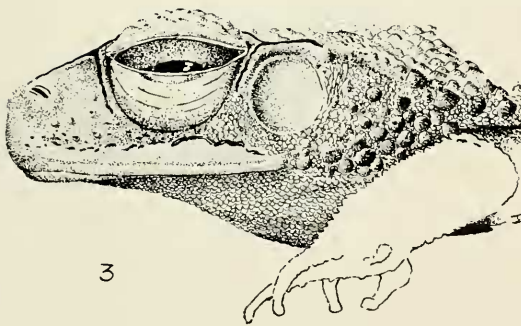
3b



2



3d



3

## PLATE LIV

*Bufo mazatlanensis* sp. nov. Type. EHT-HMS, No. 374; Mazatlán, Sinaloa.



PLATE LIV



## PLATE LV

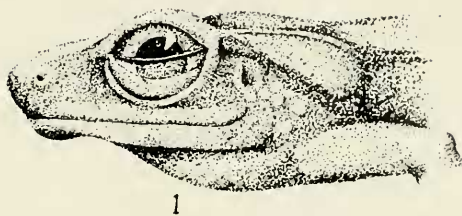
FIG. 1, 1a, 1b. *Tomodactylus angustidigitorum* sp. nov. Type. EHT-HMS. No. 18640; Quiroga, Michoacán.

FIG. 2, 2a, 2b. *Tomodactylus macrotimpanum* sp. nov. Type. EHT-HMS. No. 6858; South of Jacala, Hidalgo.

PLATE LV



2b



1



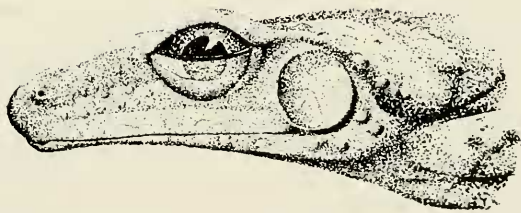
1b



1a



2a



2

## PLATE LVI

FIG. A. *Microbatrachylus albolabris* sp. nov. Paratypes. EHT-HMS, No. 6407 A; near Córdoba, Veracruz. (14 mm.)

FIG. B. Same. EHT-HMS, No. 6408; Mazatlán, Guerrero. (18 mm.)

FIG. C. *Microbatrachylus minimus* sp. nov. Paratype. EHT-HMS, No. 6411; Agua del Obispo, Guerrero. (14 mm.)

FIG. D. Same Type. EHT-HMS, No. 6416; Agua del Obispo, Guerrero. (15 mm.)

PLATE LVI



A



C



B

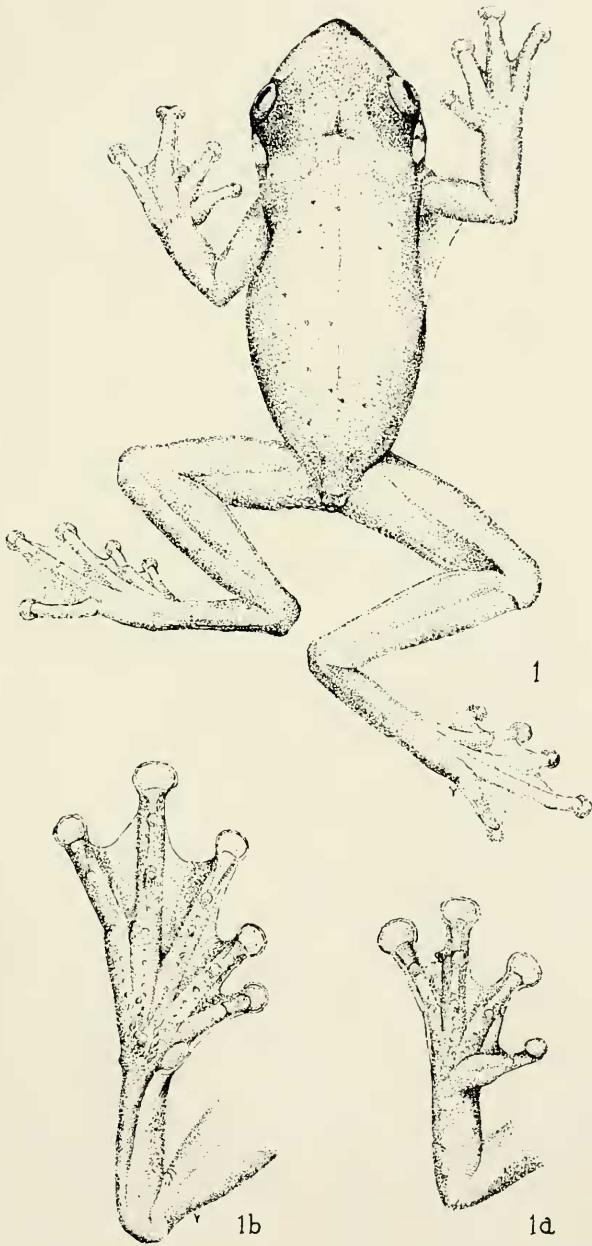


D

## PLATE LVII

*Hyla melanomma* sp. nov. Type. EHT-HMS, No. 21578; seven miles east of Chilpancingo, Guerrero.

PLATE LVII



## PLATE LVIII

*Hyla forbesi* sp. nov. Type. EHT-HMS, No. 22276; near Acultzingo, Veracruz.



PLATE LVIII



## PLATE LIX

*Hypopachus cuneus nigroreticulatus* subsp. nov. Type and paratypes. About natural size.

FIG. A. Type, ♀, EHT-HMS, No. 12605. Encarnación. Campeche.

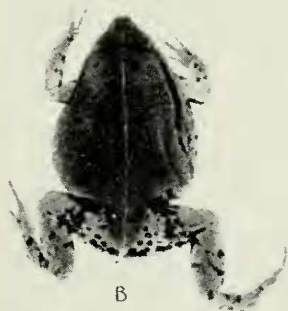
FIG. B. Paratype, ♂, EHT-HMS, No. 12652. Topotype.

FIG. C. Paratype, ♀, EHT-HMS, No. 12650. Topotype.

FIG. D. Paratype, ♀, EHT-HMS, No. 12656. Topotype.

FIG. E. Paratype, ♀, EHT-HMS, No. 12655. Topotype.

PLATE LIX



## PLATE LX

*Hypopachus alboventer* sp. nov. Paratypes. Dorsal and ventral views.  
(About natural size.)

FIG. 1, 1a. EHT-HMS, No. 6552, Huajintlán, Morelos.

FIG. 2, 2a. EHT-HMS, No. 6553, Huajintlán, Morelos.

FIG. 3, 3a. EHT-HMS, No. 6554, Huajintlán, Morelos.

PLATE LX



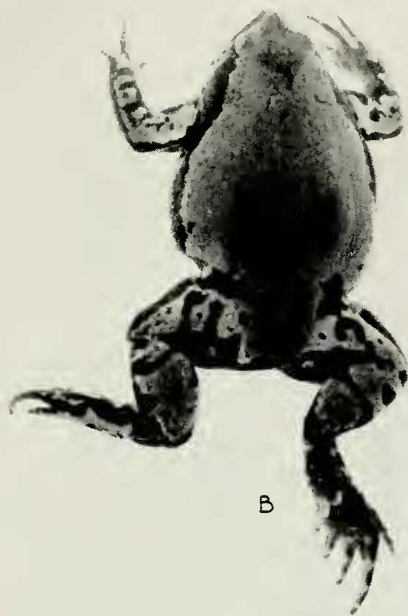
## PLATE LXI

*Hypopachus caprimimus* sp. nov. Paratypes.

FIG. A. EHT-HMS, No. 6560; Agua del Obispo, near Rincón, Guerrero.  
(Length, 48 mm.)

FIG. B. EHT-HMS, No. 6562; Agua del Obispo, near Rincón, Guerrero.  
(Length, 42 mm.)

PLATE LXI



B



A

## PLATE LXII

FIG. A. *Hypopachus cuneus cuneus* Cope. EHT-HMS, No. 1095; Forlon, Tamaulipas.

FIG. B. Same. EHT-HMS, No. 1096; Forlon, Tamaulipas.

FIG. C. *Hypopachus avis* sp. nov. Paratype. EHT-HMS, No. 1041; Tepic, Nayarit.

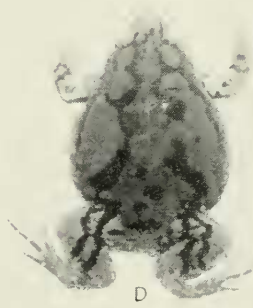
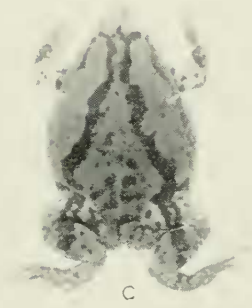
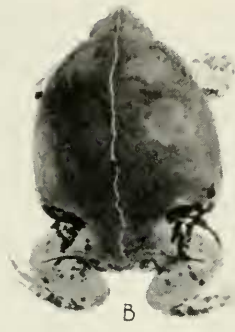
FIG. D. Same. EHT-HMS, No. 1046; Tepic, Nayarit.

FIG. E. *Hypopachus maculatus*, sp. nov. Paratype. EHT-HMS, No. 1018; Asunción, Chiapas.

FIG. F. Same. EHT-HMS, No. 1017; Asunción, Chiapas.



PLATE LXII



## PLATE LXIII

FIG. 1, 1a. *Hypopachus caprimimus* sp. nov. Paratype. EHT-HMS, No. 6556; Agua del Obispo, Guerrero.

FIG. 2, 2a. *Hypopachus maculatus* sp. nov. Paratype. EHT-HMS, No. 1016; Asunción Chiapas.

FIG. 3, 3a. *Hypopachus alboventer* sp. nov. Paratype. EHT-HMS, No. 6553; Huajintlán, Morelos.

FIG. 4, 4a. *Hypopachus cucus* var. EHT-HMS, No. 1031; Encero, Veracruz.

FIG. 5, 5a. *Hypopachus ovis* sp. nov. Paratype. EHT-HMS, 1071; Tepic, Nayarit.

FIG. 6, 6a. *Hypopachus oxyrhinus?* EHT-HMS, No. 986; Zapotiltic, Jalisco.

FIG. 7, 7a. *Hypopachus cucus cucus* Cope. EHT-HMS, No. 1032; Rio Grande City, Texas.

PLATE LXIII

